FOR
BETTER MANAGEMENT
OF
PLANT OPERATIONS

# FACTORY

september 1960

PRICE ONE DOLLAR

A McGRAW-HILL PUBLICATION

A PLANT
ENGINEER
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COVER STORY
NEW POWER PUTS
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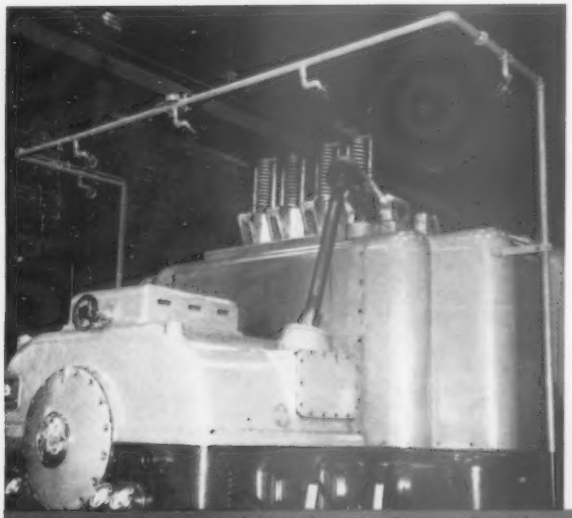
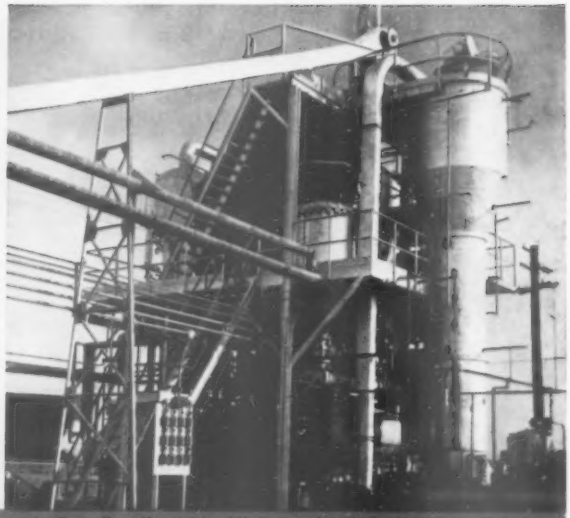


At Pennsylvania Power and Light Company, Sunbury, Pa., this steam generator is protected by an automatic Grinnell ProtectoSpray system in the event of outside fires and by a Dry Chemical system inside the casing.



At Canadian Vegetable Oil Processing Ltd., Hamilton, Ontario, Grinnell ProtectoSpray safeguards upper structure of this hexane solvent extraction unit, while a ProtectoFoam system guards the lower section.

At the RCAF supply depot at Namao, Alberta, this infrared drying oven is protected by a Dry Chemical system engineered by Grinnell to protect against possible fire resulting from ignition of flammable vapor mixtures.

At Dresser Industries, Inc., Dallas, Texas, hot metal temporarily ignites resulting vapors as metal is being submerged. If fire should get out of control, a Grinnell-installed Carbon Dioxide system is on guard to extinguish it quickly.

# You can rely on Grinnell for the right protection against destruction by fire!

Grinnell has had 90 years experience in devising fire protection systems for all kinds of fire hazards — systems which can be relied on to protect the continuity of your business and to safeguard your dollar investment. Grinnell offers you quality-controlled manufacturing, layouts by experienced engineers, and installations by skilled crews. Let Grinnell engineers help you select the right system.

**16 mm. Sound-Color Film**—Get up to date on fire with Grinnell's 35-minute film — "Fire Protection Through Research." Both typical and unusual fire hazards are described and demonstrated. To borrow this film, without charge, write — Grinnell Company, Providence 1, Rhode Island.

GRINNELL

FIRE PROTECTION SYSTEMS SINCE 1870

For more facts circle 382 on READER SERVICE CARD

B.F.Goodrich

# V belt briefs

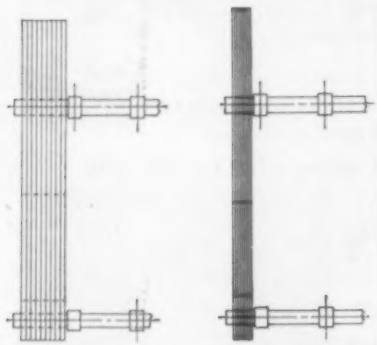
TIPS ON THE CARE, MAINTENANCE AND SELECTION OF V BELTS FOR INDUSTRY

ORDINARY V BELT DRIVE

MAXIPOWER DRIVE

**SAVE $402.14 ON V BELT DRIVES**—*Costs for* both *sheaves and V belts were cut when B.F. Goodrich Maxipower belts replaced ordinary belts on this drive. Size and weight of sheaves were reduced, smaller and fewer V belts were used*—eight *5V2500 belts replaced* nine *D-240 belts. The result: a $402.14 saving. Costs can be cut as much as 30% by switching to a Maxipower V belt drive.*

## How Maxipower V belts reduced bearing load 42%

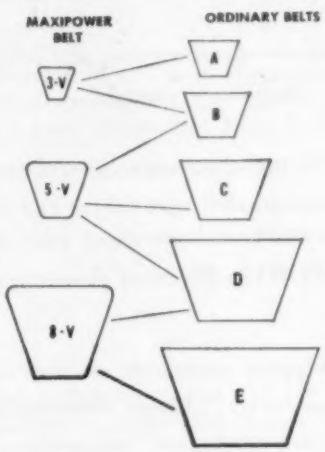


ORDINARY DRIVE MAXIPOWER DRIVE

In the installation shown above, sheaves for the Maxipower drive are lighter, have a face width of only 5 13/16", compared to a 13¼" width for the sheaves on the ordinary drive. Because there's less weight, less shaft overhang, bearing load for this Maxipower drive is 42% less for the driven shaft shown than the drive replaced. This greatly increases bearing life.

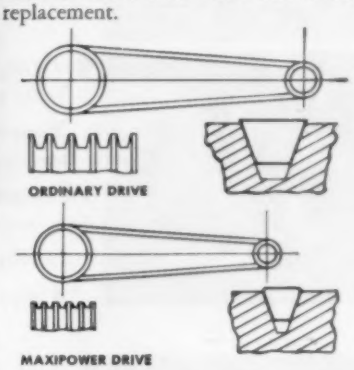
## With Maxipower V belts, three cross sections do the work of five

Each cross section of the new B.F. Goodrich Maxipower V belts has been fitted to a particular horsepower range so that only three cross sections are needed instead of the A, B, C, D, and E sections of conventional V belts. The three cross sections are 3V, 5V and 8V.




## New BFG Maxipower V belts save space, weight, bearings, dollars

New B.F.Goodrich Maxipower V belts give up to three times the horsepower-carrying capacity in the same amount of space as ordinary belts. This more compact drive gives you more horsepower per dollar, results in substantial savings, both in initial costs and often in belt replacement.



ORDINARY DRIVE

MAXIPOWER DRIVE

In most Maxipower installations, fewer belts and smaller diameter sheaves are used, center distances are shorter. Costs can be cut up to 30%, valuable space is saved. Sheaves have narrower grooves and groove spacing, are smaller, less costly. The smallest sheaves that can safely be used with the drive motor can be installed. Often these will be 50% smaller than present drives. This reduced sheave weight and face width means less shaft overhang, less bearing load—increased bearing life.

The extra strength of Maxipower V belts comes from its new rubber compounds, the tough fibers used in its load-carrying cords, and the new "deep V" design. Because of this design the belt's load-carrying cords are supported so completely that each has an equal share in the load—none "loaf".

All Maxipower V belts are heat-resisting, oil-resisting at no extra cost. Belts with static conducting properties can also be ordered *at no extra cost.*

For further information and help in selecting Maxipower belts for your drives, call your B.F.Goodrich distributor. *B.F.Goodrich Industrial Products Company, Dept. M-908, Akron 18, Ohio.*

**B.F.Goodrich V belts**

FOR BETTER
• PLANT MAINTENANCE & ENGINEERING
• PRODUCTION
• PLANT MANAGEMENT

SEPTEMBER 1960

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## COMING

**In October** you'll read about computer-controlled plant stores that can save you time and money, and about a sprawling electronics plant where management cooperation lops millions from costs with a flick of the wrist . . . **In coming months** watch for an exclusive interview with the men who set the pace in plant safety practice and thinking, and for the story of a small plant where every single manager is a production savings specialist.

THE COVER

Splashed by light from a bank of fluorescent lamps, Brunswick managers, Vihstedt, Neff, and McNamee, review power modernization progress at Muskegon (Mich.) pinspotter plant. *Painting by Frank Lacano*

69TH YEAR OF PUBLICATION

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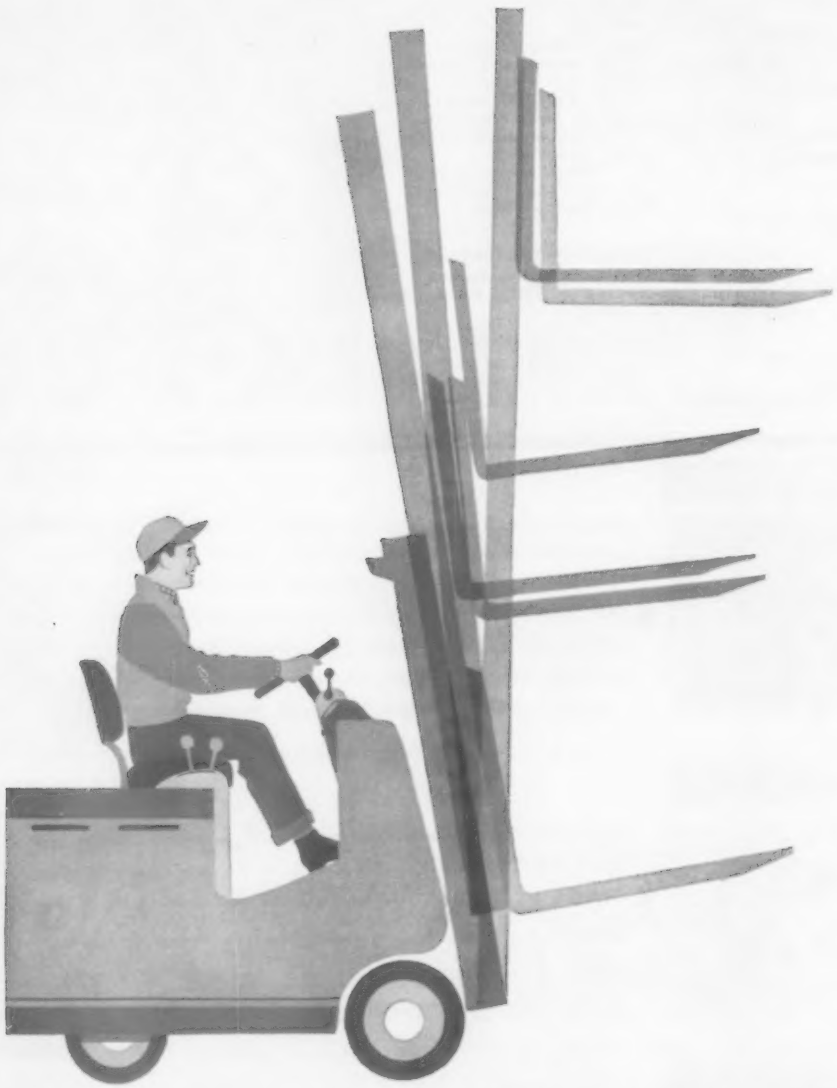

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**New Exide battery for small industrial trucks and personnel carriers.** Model 3-KCS-9. Features new-design tubular positive plate. Up to 30% more capacity than automobile batteries. Up to four times their average life. Fits same compartment. Write for new bulletin.

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# 6 simple steps to savings via a Rubber Railroad Crossing

1 Nail framed risers to top of ties – to hold rubber-cushioned pads at proper height for years of smooth, quiet, maintenance-free crossing despite hard use in heavy traffic.

2 Force steel-backed rubber center pads into place over risers – their sealing lips fitting tightly against both rails for permanent, watertight, weatherproof installation.

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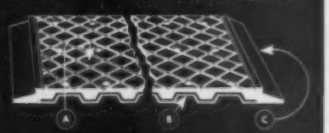
5 Insert rubber plugs into all the countersunk screw holes – a permanent barrier against seepage that might rot ties or foul ballast.

6

GOODYEAR INDUSTRIAL PRODUCTS

GTR-Specified

Molded Rubber Railroad Crossing Pads




**A** Thick pad of solid, tough stock for excellent resistance to cutting, wear, weather and low temperatures

**B** Heavy-gauge steel plate reinforcement follows contour of corrugated pad bottom

**C** Tough integral flanges seal tightly against tracks when pad is sprung into place

It's easy to see why the G.T.M. – Goodyear Technical Man–recommends Rubber Railroad Crossings for inter-plant use – especially for handling spillables or breakables. Not only is their installation easy, but they don't splinter like wood–crumble like concrete–soften up or rut like asphalt. In fact, after years of hard use, they've proved virtually maintenance-free.

For the complete story, write Goodyear, Industrial Products Division, St. Marys, Ohio, Los Angeles 54, California, or Akron 16, Ohio.

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THE GREATEST NAME IN RUBBER



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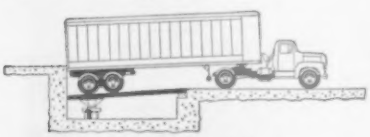
Just a touch of a button and any truck bed is brought into perfect platform level at loading docks equipped with the Rotary Truck Leveler. Dangerous inclines between dock and truck bed are eliminated so that materials handling equipment can move in and out with maximum speed and safety. This modern hydraulically-operated device now has a 16′ platform and 3′ vertical travel to accommodate highway carriers of all sizes. The Rotary Truck Leveler can be installed at new or existing buildings and saves valuable space since it is recessed into the pavement in front of the loading dock.



*RAISES OR LOWERS TRUCK BED TO DOCK LEVEL*

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6 **Circle 387 on Reader Service Card**

# FACTORY LETTERS

## Industrial TV is booming

Dear Sir:

The need for an excellent article like "The Truth About Industrial TV" (July FACTORY, page 78) has been great. Mr. Quinn's positive approach to the use of television in industry should make many production people realize how much direct-wire television can do and how fast it is moving ahead.

But the author's statement that "the biggest ITV manufacturer builds cameras a few dozen at a time" is out of date. As the country's largest producer of closed-circuit TV cameras, even our smallest production runs exceed 1000 units.

Robert Kreiman
Vice President, Audio-Visual Systems
Argus Cameras, Inc., Ann Arbor, Mich.

► FACTORY's data were based on 1959 output. If proof is needed that ITV is booming, Mr. Kreiman's 1960 figures should be convincing.—ED.

## Deep thoughts on politics for managers

Dear Sir:

I have read your article "Should Plant Management Play the Game of Politics?" (June FACTORY, page 89) and I consider it an excellent one. The style is easy and the material informational. This is also the opinion of other members of my staff whom I asked to review the piece.

Today it is extremely important for all Americans to take an active interest in politics. Certainly, industry, which has a vital stake in the survival of our free economic system, should make every effort to present its point of view to elected government officials on questions that affect the welfare of business and the country. As you point out, the majority of management is still undecided on what its role should be in politics and to what extent a company should encourage the political activities of employees. My own company is extremely interested in this matter, but as yet we have come to no firm conclusions regarding policy. Your article will be useful in helping us decide.

I should like to know on what basis Ford evaluates its programs. I realize that appraising the effectiveness of a non-partisan educational program is difficult, but I would think management would have to be in a position to justify the expense of any of its activities. This is no criticism of the Ford program. I am only interested in finding out how a company measures results.

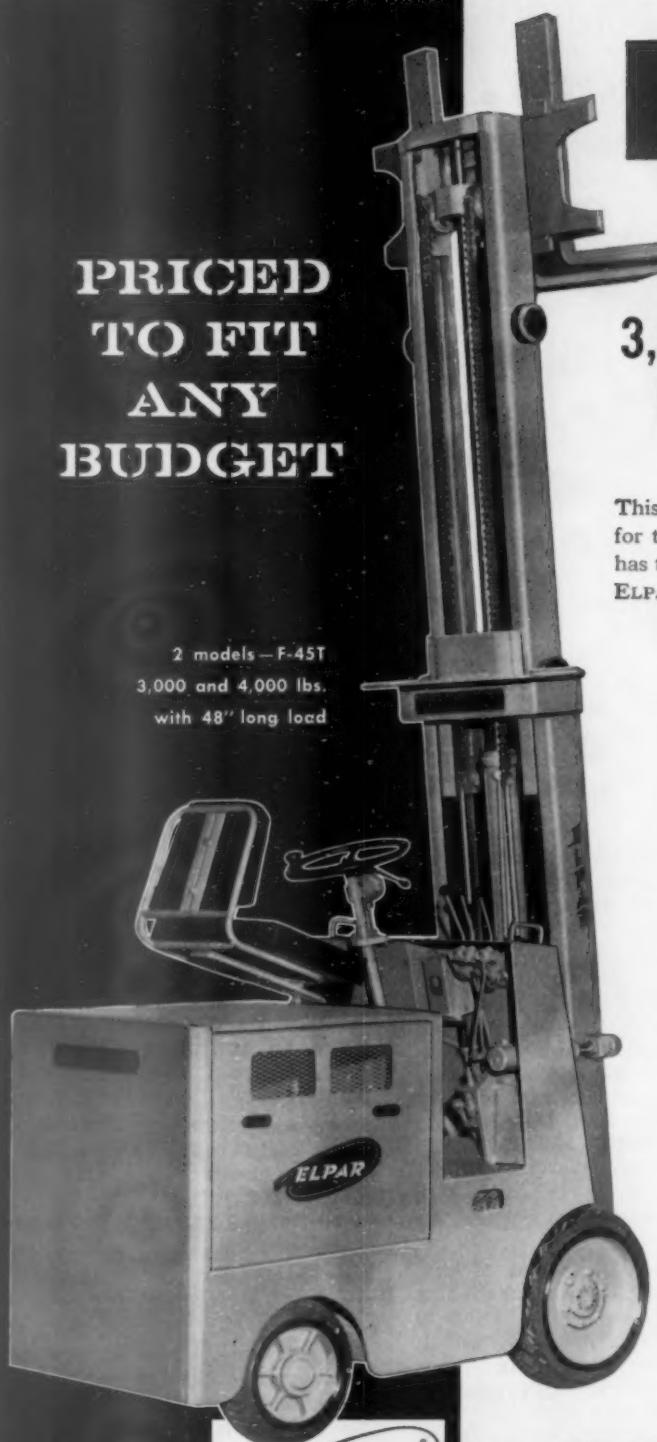
Perhaps the most valuable part of the article from our point of view is your to-the-point discussion of the legal difficulties a company might encounter in sponsoring a political action program even on a non-partisan basis. This will be useful to us should we

# ELPAR "F-45T"

## 3,000 & 4,000 lb. Cap. Electric Fork Truck

PRICED TO FIT ANY BUDGET

2 models—F-45T
3,000 and 4,000 lbs.
with 48" long load




This ELPAR fork truck is the new pace setter for the industry. It's priced competitively yet has the traditional quality that is typical of all ELPAR electric trucks. Check these advantages:

**FAST**—Travel speeds up to 7 MPH and lift speeds to 40 FPM.

**COMPACT**—Only 35" wide with an 84½" stacking aisle (less forks).

**DEPENDABLE**—Heavy duty construction, oversize tires, low pressure hydraulics, rugged drive axle, center-sill frame.

**SAFE**—Wide stance trail axle—26¾" tread, hydraulic wheel brakes, inching control, improved operator vision.

**ECONOMICAL**—Operates on pennies per day electric power and is designed for fast, easy maintenance.

This truck has been job tested in service on all kinds of jobs and has proved its economy and dependability.

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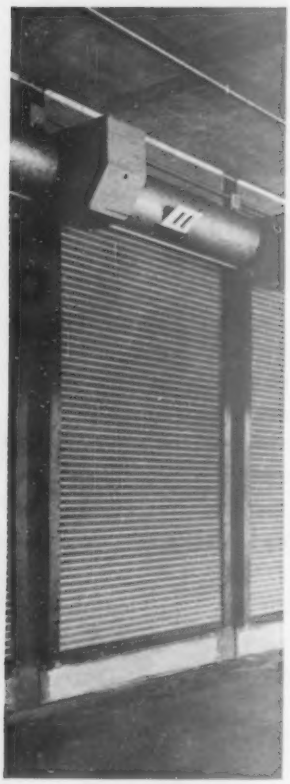
Double the life—One-third the operating cost.

# *Kinnear* Motor Operated *Rolling Doors...*

*a feature of Theo. Hamm Brewing Company's*

## Automated Loading Dock



Here again, Kinnear Rolling Doors play a key role in *modern efficiency at its best!*

The 23 power-operated Kinnear Rolling Doors you see above are controlled independently from a master switch.

Conveyors ending just inside each door deliver pallets holding cases of beer to the loading dock. The door can then be opened by remote control. A fork truck picks up the pallets, travels onto dock levelers (at right, top photo) and loads the pallets on the waiting truck.

(Empty cases on pallets are returned to other conveyors through doorways installed higher above the dock level.)

By opening straight upward and coiling compactly over the doorway Kinnear Rolling Doors permit conveyors to come within *inches* of the door. Doors can be placed as close together as desired, with control switches at each door if preferred.

(Auxiliary chains, for door operation in case of power failure, are stored in the hood of each door.)

A rugged, all-metal curtain protects each opening when the Kinnear Rolling Door is closed — a positive barrier to trespassers, vandals, wind, and weather, *plus added protection against fire.*

Your needs may be vastly different; but *wherever you need* doors, you need the advantages of Kinnear Rolling Doors.

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KINNEAR ROLLING DOORS
*Saving Ways in Doorways*




decide to engage in such an effort.

Your article gives an excellent account of what large or small companies can do toward increasing the political consciousness of employees. Anyone reading "Should Plant Management Play the Game of Politics?" would likely answer "Yes" to this question.

J. W. Oram
Vice President
Pennsylvania Railroad Co.
Philadelphia

► We appreciate your interest and agree with most of your observations. For more on program evaluation, and for a further penetrating study of the politics problem, see page 91 of this issue.—ED.

Dear Sir:

I have read "Should Plant Management Play the Game of Politics." I approve of this kind of activity. I realize that in some cases it could result in some injudicious slanting of the discussion of issues, but I am one who depends on the judgment of people to prevail for the good in the long run. The main rules I would suggest in political participation are to strive for fairness and to stress reason and logic above emotion and prejudice.

Herschel C. Loveless
Governor of Iowa
Des Moines

Dear Sir:

Everyone with a sense of responsibility and a desire to maintain our democratic free society has a role in politics. If he accompanies these principles with leadership initiative, he will encourage others to vote, do what he can to get competent and honest candidates

**WHAT'S BECOME OF INNER SPACE?** Warehouse space, for instance. Inch by inch the cost of space has gone up until maximum use of storage facilities is as important to your profits as your product's acceptance in the market place. CCA packaging engineers know that economical use of valuable **inner** space depends on the **outer** space a container takes up in your warehouse. To **pack it—move it—sell it** is the business of CCA packaging.

CCA

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has what it takes to make
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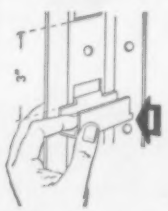

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on the ballot, and furnish constructive advice to those elected.

The person who does not carry his political load is not carrying out his job as a good citizen.

Stuart Symington
United States Senate
Washington, D.C.

Dear Sir:

I have read "Should Plant Management Play the Game of Politics," and think you have covered the area thoroughly.

Knowing the successful results of a number of programs carried out by industry in this area, I certainly feel that management has not only a responsibility but a very real contribution to make to politics.

Frances P. Bolton
House of Representatives
Washington, D.C.

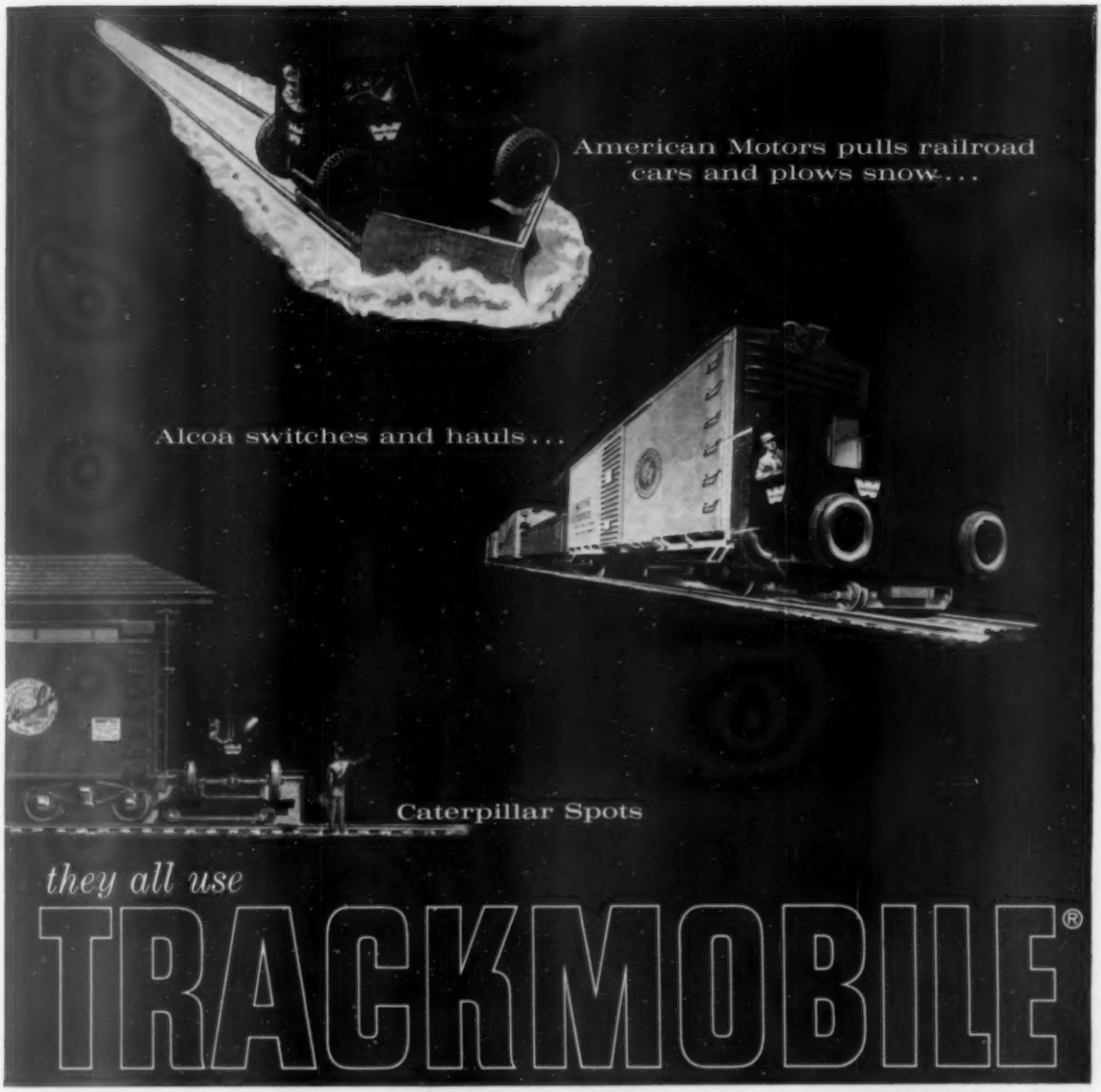
## Warehousing flexibility

Dear Sir:

In your third Engineering and Technology Report, "Warehousing Today," (FACTORY, March, page 101) you advocate more flexibility to accommodate inventory surges and drop-offs. The principle and methods of application offered are correct, but the discussion is not adequate. What of over-all volume decreases that cause idle manpower and vacant facilities?

Few industries can keep a perfect balance of production and sales. Costs will

FACTORY welcomes opinions and suggestions from its readers. They help us put management problems in better perspective. Letters should be addressed: The Editor, FACTORY, 330 West 42nd St., New York 36.

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mount if they try to accomplish too much with inflexible space.

Enclosed is literature descriptive of the manner in which commercial warehousing in the U. S. functions to provide desirable flexibility for thousands of our nation's manufacturers, distributors, and retailers. We trust you will find it interesting.

Donald E. Horton
Executive Vice President
American Warehousemen's Association
222 W. Adams St.
Chicago 6.

► Mr. Horton's point is well founded. We have read his literature, and we urge our readers to solicit (from the Chicago address above) his brochure, The Modern Method of Distribution, for a solid explanation of the public warehouse. Also available is a thorough definition of the term "bonded warehouse."—ED.

FACTORY

September 1960 Vol. 118, No. 9

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Muzak reduces boredom, tension and fatigue through scientific musical mood stimulus that produces measurable results.

# "Muzak increased production 16½% at J. Strickland & Co. with no extra payroll cost"

All management faces problems of production-loss, absenteeism, tardiness, office tension, and employee turnover. At J. Strickland & Company, Memphis, Tenn., one of America's leading cosmetic manufacturers, Muzak's special kind of music has helped to solve these problems.

George B. Long, President, says, "Muzak's programming technique really motivates people. It has not only improved our factory production by 16½%, but has also relieved job monotony and fatigue."

Muzak gets such results because Muzak is planned for results. Based on 25 years of psychological research, Muzak's work-motivation music is specially arranged and recorded to scientifically measurable response at exact times. It follows a psychological pattern that varies to offset boredom, fatigue, tension and absenteeism.

This special music programming formula is copyrighted; only Muzak has it, and Muzak can produce scientifically measured proof of its benefits.

How Muzak can accomplish such results for J. Strickland & Company, and for thousands of others, is told in an interesting booklet, "Music and Muzak." Write for the unique booklet, "Music and Muzak," with its detailed information on work-motivation music as an investment for profits which should be working for you. Muzak Corporation, 229 Park Ave. So., N.Y. 3, N.Y.

Muzak reduces tardiness, absenteeism and employee turnover because it makes jobs more interesting and helps work go better.

George B. Long, President of one of America's largest cosmetic manufacturers, says, "Muzak really motivates people. Our increase in production is the equivalent of 7 new employees, in just one department, with no extra payroll costs."

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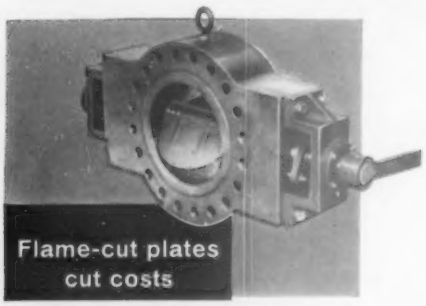
# METALOGICS* IN



## Flame-cut plates cut costs

**HIGH REJECTS:** Use of flat steel castings for valve bodies, with I. D. ranging from 4″ to 60″, accounted for increases in costs for this manufacturer. Pattern costs rose because of numerous changes . . . rejects were high due to porosity and other casting faults that showed up only after machining.

**HIGH QUALITY:** Ryerson recommended using flame-cut plates ranging in thickness from 1″ to 8″. Results: greater production flexibility, faster delivery, lower cost and a stronger product for this high-pressure service. Tight Ryerson quality control delivered plates of exceptionally clean surface to exact thickness of finished product, requiring little machining.

## Machine cut rings solve problem

**PLATES REQUESTED:** Ryerson was asked to bid on supplying ¼″ Type 410 stainless in 27½″ square plates. Material was to be used for orifice plates for 16″ burner, subjected to elevated temperatures.

**RINGS RECOMMENDED:** Going beyond material specs, the Ryerson representative found that the customer intended to cut plate into 27⅛″-diameter rings with 13.120″ bore—and then mill 12 slots in outer diameter for expansion relief. Knowing the application, Ryerson recommended supplying machine-cut rings in which slots could then be punched rather than milled. Production savings enabled switching to Type 304 at less cost than Type 410 with slots milled.

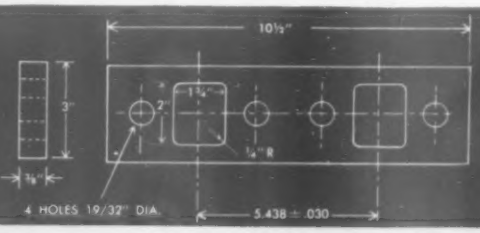
Look at these random examples and see how Ryerson Metalogics sparks real savings by continually searching for and suggesting new materials, methods and techniques.

The broadest experience anywhere combines with the widest range of stocks available to offer you unbiased recommendations on the best material for any job—be it steel, aluminum or plastics. Always the right metal-fabricating machine, too—for Ryerson is the nation's largest distributor.

Your Ryerson representative is "Metalogics-trained" to help you *value-analyze* selection, fabrication and application problems. Get his constructive ideas soon, and see how he can help you select and apply material from our vast stocks. It's the "Metalogical" thing to do.

**The Ryerson science of giving optimum value for every purchasing dollar.*

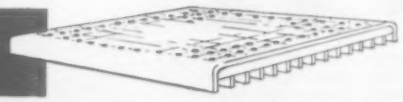
## Saved: $100 per thousand




**PROBLEM:** Muffler manufacturer required accurately finished mounting plates made from ⅜″ x 3″ bar. Cutting bars to size, burning 1¾″ x 2″ holes and drilling four 19/32″ holes proved time-consuming and expensive.

**SOLUTION:** Ryerson recommended that they eliminate cutting, burning and drilling operations by stamping the part from Ryerson forming-quality plate. One operation instead of three cut costs $100.00 per thousand pieces and quickly justified the small initial investment in dies.

## Suggestion saves 85%



**ASKED FOR:** Customer wanted 1″ hot rolled plate to cover about 80′ of 24″ open trench. Plate was to be cut into 24″ x 27″ segments—each containing 900 ⅜″ holes to filter the product.

**RECOMMENDED:** After studying application and cost, Ryerson recommended a design combining perforated light plate, formed to channel shape, and grating for structural support. Ryerson experience and imagination saved 85% of the original cost.

## Soft touch on fabricating sheets

**THE NEED:** Cold rolled sheets that would take severe forming and retain smooth, dull surface for high lacquer finish. Sheet quality was found on inspection to vary widely from one shipment to the next, causing variations in forming and finishing operations . . . high reject rate.

**THE ANSWER:** The Ryerson representative showed how our stringent quality controls would assure consistent quality on every shipment so that forming and finishing could be standardized for better results . . . lower production cost figures.

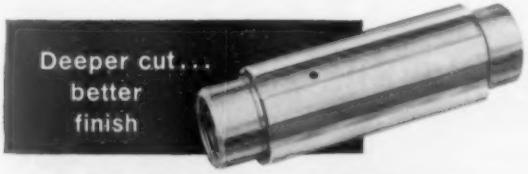
# ACTION

**BEFORE:** Job shop was using MT 1015 tubing in the manufacture of this coupling. Machinability was satisfactory, but rising costs of operation led to a search for ways to economize.

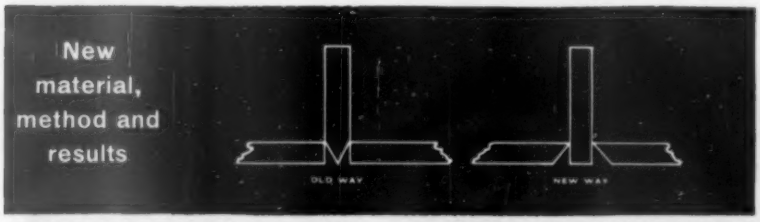
**AFTER:** Careful study by the Ryerson representative brought about a change in material. He recommended using Ledloy® 170 tubing, which increased machining speed to 170 s.f.m. and stepped up production 30%. Ryerson's stocks include the widest range of fast machining alloys—types and sizes to fit your every need.

**OLD WAY:** A screw machine shop used nylon in the manufacture of nipple adapter and coupling nuts—until a Ryerson representative came on the scene.

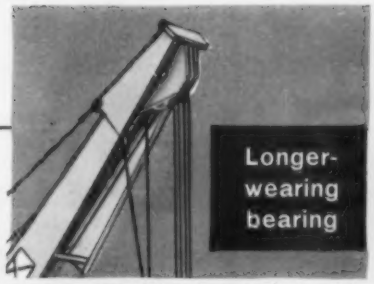
**NEW WAY:** At his suggestion, they changed to Ryertex-Omicron PVC—cut costs 50%. PVC machined better—to closer tolerances, with improved finish . . . ran faster without "gumming." Note exact cutting of threads and barbs. Threads fit perfectly.




**SEARCH:** Complicated machining of a carbide grade gear shaft included cuts up to ½". It was discovered that required machining was too slow with the steel chosen for the job.
**ANSWER:** Rycut® 40 was recommended by the Ryerson representative. This free machining alloy fit the situation perfectly. The company found that Rycut 40 machined at 250 s.f.m., gave a better finish, increased tool life, and lowered total per-piece cost. An alloy in the Rycut series may well lower your costs.




**OLD:** Rows of vertical aluminum grid members were attached to an aluminum base plate by notching the grid members and welding. (2024-T3 aluminum plate was used.) However, upon cooling, welds fractured—causing a high reject rate on this assembly.
**NEW:** A Ryerson representative suggested undercutting the base plate (as shown) instead of the grid members. This exposed a greater area to heat and permitted a larger deposit of weld material. Another Ryerson suggestion: change material to 5052-H34 aluminum, which responds better to welding operations.




**5-DAY LIFE:** The sheaves that guide the enormous digging buckets of underwater dredges take a very severe load. Bronze bearing in the sheaves had to be replaced every four or five days.

**6 MONTHS, SO FAR:** After discussing the problem with a Ryerson man, the chief engineer decided to try a bearing made of Ryertex. The change was made, and five months later hardly any wear was noticeable! With its low friction coefficient, Ryertex is nonbinding, even on itself.

## 2 metalworking machines for the price of 1

A fabricator of stainless steel kitchen equipment was recently in the market for a new squaring shear. The one under consideration had a gap-type frame which would enable him to do an important notching operation—necessary for certain sink tops. After careful study, a Ryerson machinery specialist recommended *two* pieces of equipment instead of one at no increase in total cost. The first, an underdriven shear. The second, a universal-type sheet metalworking machine that would do the required notching, plus many other jobs—adding versatility to the entire operation.

**PRODUCTS IN STOCK**

**STEEL**—carbon, alloy, and stainless steel—bars, structurals, plates, sheets and strip, tubing, etc.

**ALUMINUM**—sheet (including new building sheet), plate, coils, rod and bar, tubing and pipe, building products, etc.

**INDUSTRIAL PLASTICS**—Ryertex-Omicron PVC in all forms. Also Ryertex® laminated phenolic plastics for bearings.

**METALWORKING MACHINERY**—the broadest line available from a single source for every kind of metal fabrication. Also specialized line of material handling equipment.

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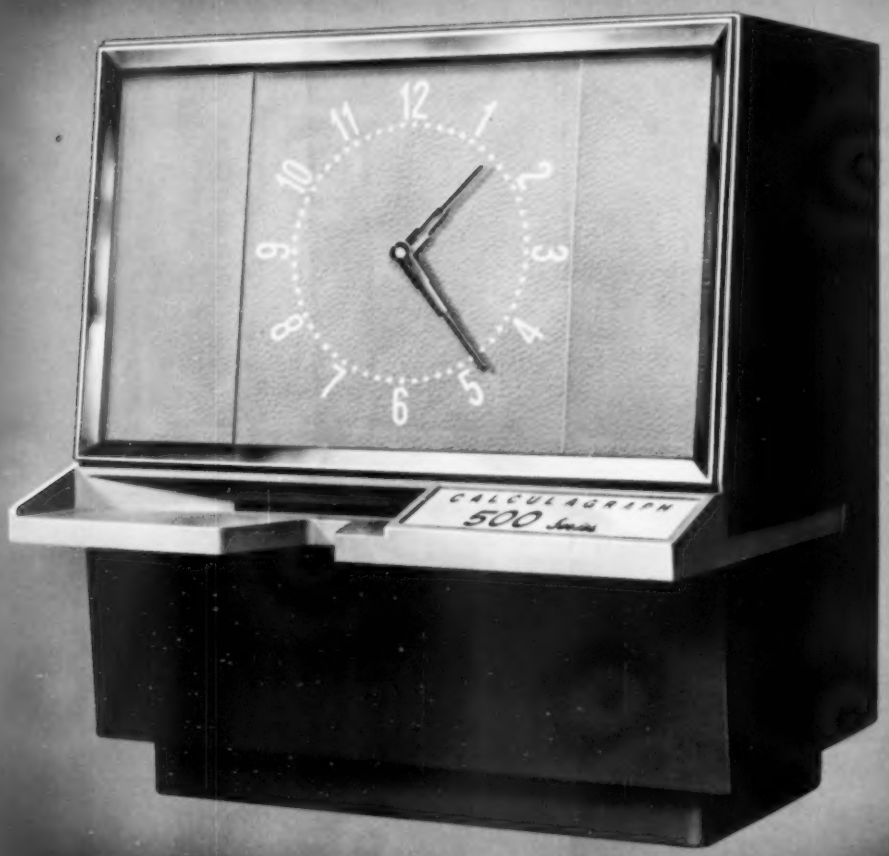
# Here is a completely new labor cost data computer




## it's the new Calculagraph 500 Series

FITS ANY SYSTEM . . .

Now the completely new Calculagraph 500 Series labor cost data computer brings automation to the largest single cost factor of most businesses — labor time.

As a system in itself or as an integral component of any cost control system, the Calculagraph corrects the weakest link inherent in most systems by automatically computing and printing actual hours worked. This will assure 100% accuracy by eliminating the human frailities in manual computation and, in most cases, eliminate most of the clerical labor costs.

As a result, in a unit card system, the Calculagraph 500 Series can save time, clerical costs, and attain greater accuracy in your input data. It can be installed without disrupting your present factory-to-office data collection procedure. We can show you how if you will send samples of your present job cards for analysis.

INDUSTRIAL DIVISION

**CALCULAGRAPH** *Company* Hanover, New Jersey

# FASTENOMICS

TIPS ON FASTENER APPLICATIONS BY STANSCREW

# Bright or Heat-Treated Hex Cap Screws? Each can save you money

Bright and heat-treated hex cap screws (SAE Grade 5) are produced to the same dimensional specifications. Heat-treating, which results in a somewhat higher cost, gives superior hardness. The greatest difference is the higher tensile strength, as shown below.

## HOW TENSILE STRENGTH COMPARES

| Diameter Coarse Thread (UNC) | Bright Cap Screws Tensile Strength (Pounds) | Heat-Treated Cap Screws Tensile Strength (Pounds) |
|---|---|---|
| ¼" | 2,200 | 3,800 |
| 5/16" | 3,600 | 6,300 |
| 3/8" | 5,350 | 9,300 |
| ½" | 9,800 | 17,050 |
| 5/8" | 14,450 | 27,100 |
| ¾" | 21,400 | 40,100 |

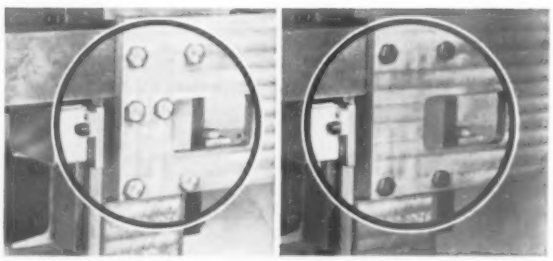
## Pick The Right One

Selecting the right cap screw can mean substantial savings. For example, in the support plate assembly at right, six ⅜" bright cap screws were used. Investigation showed four 5/16" heat-treated cap screws could do the job more efficiently. By eliminating two fasteners and substituting a smaller size, total fastener costs were cut 37% . . . and important additional savings were made by reducing machining and assembly time.

The best answer for any application can be determined only after careful consideration of the advantages and disadvantages of both fasteners.

## Bright Hex Cap Screw Advantages

1. In pure fatigue (no pre-stress on the fastener) the difference in fatigue strength between a bright and a heat-treated cap screw is not sufficient to offset the cost difference.
2. When bolting low strength materials, high clamping forces can cause the material under the bolt head to indent. Here the higher clamping force of the heat-treated screw offers no advantage.



Fastener costs were cut 37% when heat-treated cap screws were substituted for "brights" in this support plate.

3. In applications where joint rigidity requires a certain minimum number of fasteners, "brights" usually are the economical answer.
4. Greater availability from local sources simplifies field maintenance.

## Heat-Treated Hex Cap Screw Advantages

1. In a rigid joint you get far more clamping force per dollar cost.
2. The shear strength per dollar cost is substantially higher.
3. When heads are exposed to abrasive conditions, heat-treated screws will sustain considerably less damage or wear.

## Hold Inventories Down

Obviously, the best and cheapest screw for each job varies with the application. Unless you use a very large quantity of each grade, however, it is seldom wise to stock two grades of the same size and type of fastener, since this raises inventory costs. Normally the simplest and cheapest approach is to stock the stronger . . . or heat-treated . . . variety.

## For Further Information

Our fastener specialists will be happy to give you further information or suggestions on specific applications. You can get in touch with them through your local Stanscrew distributor. He'll also be happy to supply you with any of Stanscrew's 5,500 different types and sizes of standard fasteners.

**STANSCREW FASTENERS**

**CHICAGO** | THE CHICAGO SCREW COMPANY, BELLWOOD, ILLINOIS
**HMS** | HARTFORD MACHINE SCREW COMPANY, HARTFORD, CONNECTICUT
**WESTERN** | THE WESTERN AUTOMATIC MACHINE SCREW COMPANY, ELYRIA, OHIO

**STANDARD SCREW COMPANY** 2701 Washington Boulevard, Bellwood, Illinois



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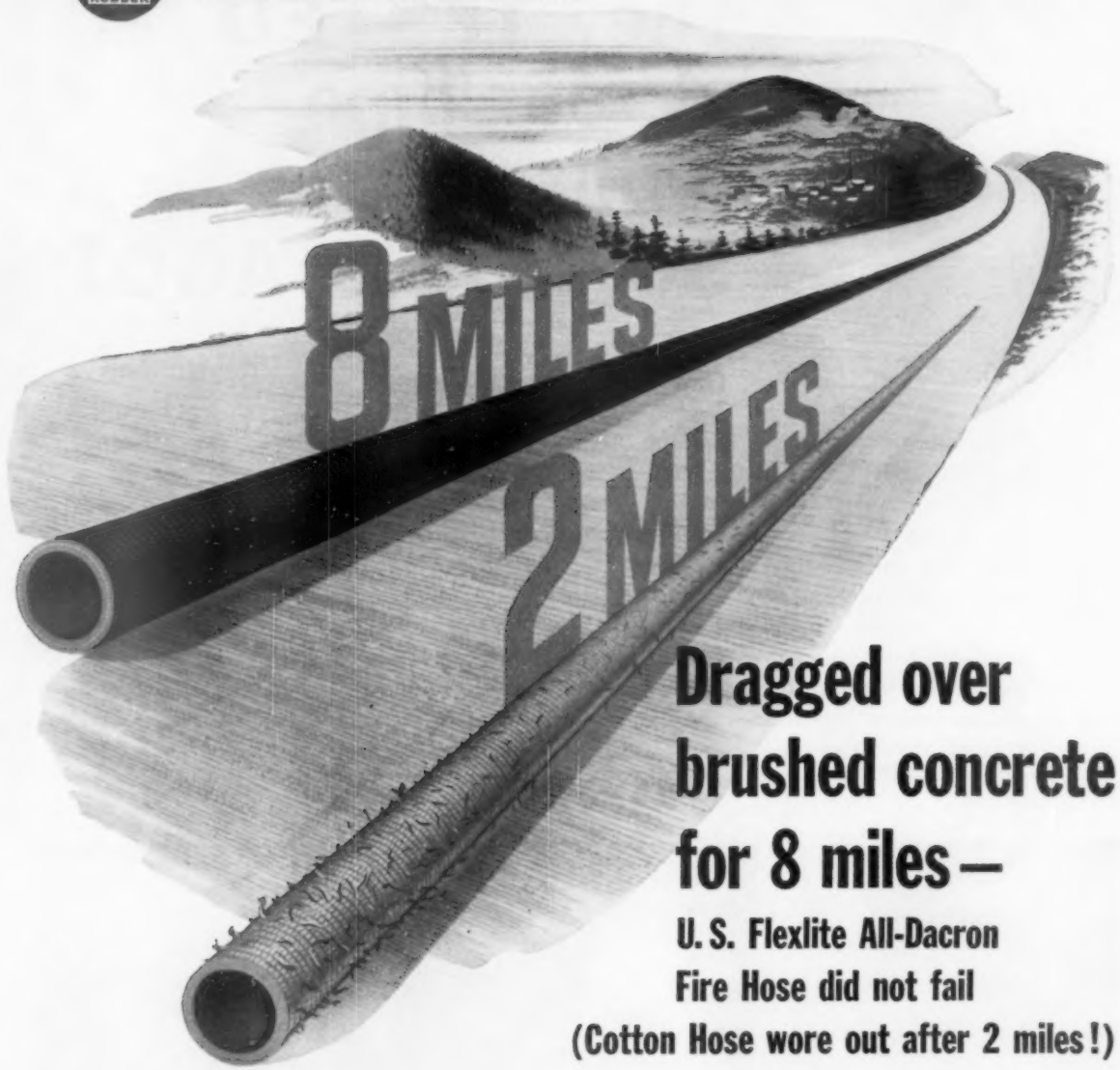
FLEXLITE ALL-DACRON FIRE HOSE

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## U. S. Flexlite All-Dacron Fire Hose did not fail (Cotton Hose wore out after 2 miles!)

This test convincingly proves the overwhelming ruggedness of Flexlite® Hose. It demonstrates, too, that a hose can be rugged and at the same time light and *flexible*. Flexlite's lightness enables fire crews to fight fire without being hampered by excess weight.

U.S. Flexlite Hose brings you these other advantages: It won't absorb water and hence can't freeze. It is highly resistant to oils and chemicals. Every foot is subjected to five hundred pounds test pressure before leaving the factory.

This hose comes in any color for ready identification as a fire hose. This prevents its being carried off or utilized for purposes other than fire fighting.

• • •

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*Today you have a better check.*

When this picture was taken, about 1910, engineers and builders had practically no backlog of experience with corrugated metal pipe. Armco Pipe had been on the market only a few years. So tests such as this gave buyers confidence.

Today there is a better test at your disposal—the test of more than 50 years of actual service. Through these service records you can view the performance of Armco Corrugated Metal Pipe in all kinds of jobs. Storm sewers, sanitary sewers, utility conduits, culverts, tunnels, stream enclosures and bridges are some of the applications in which Armco Pipe has proved itself.

Armco Pipe is a member of a full line of drainage and construction products made and sold by Armco. You can get complete facts on versatile Armco Corrugated Metal Pipe in our new catalog. Use the coupon to order your free copy. Armco Drainage & Metal Products, Inc., 6400 Curtis Street, Middletown, Ohio.

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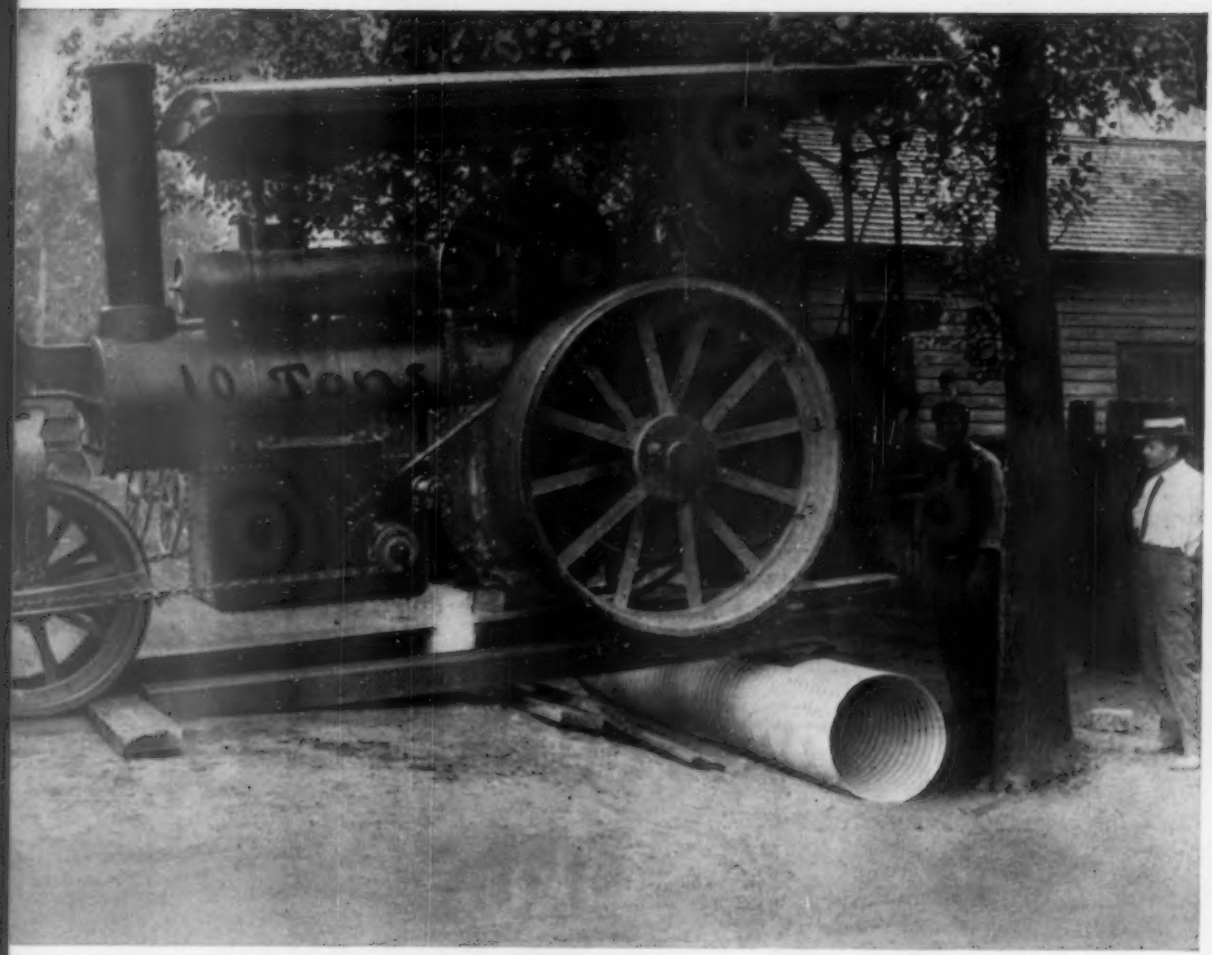

4

5

**1.** Inspection shows sewer in Pocatello, Idaho, installed in 1914, is in excellent condition. **2.** Armco SMOOTH-FLO® Sewer Pipe being installed for real estate development. **3.** This Armco Pipe functions as a conduit for utility lines under railroad. **4.** Armco Research Engineer checks 20-year performance record of Armco Pipe under the Pennsylvania Turnpike. **5.** Conveyor housing is a 96-inch diameter Armco Pipe.

Steel

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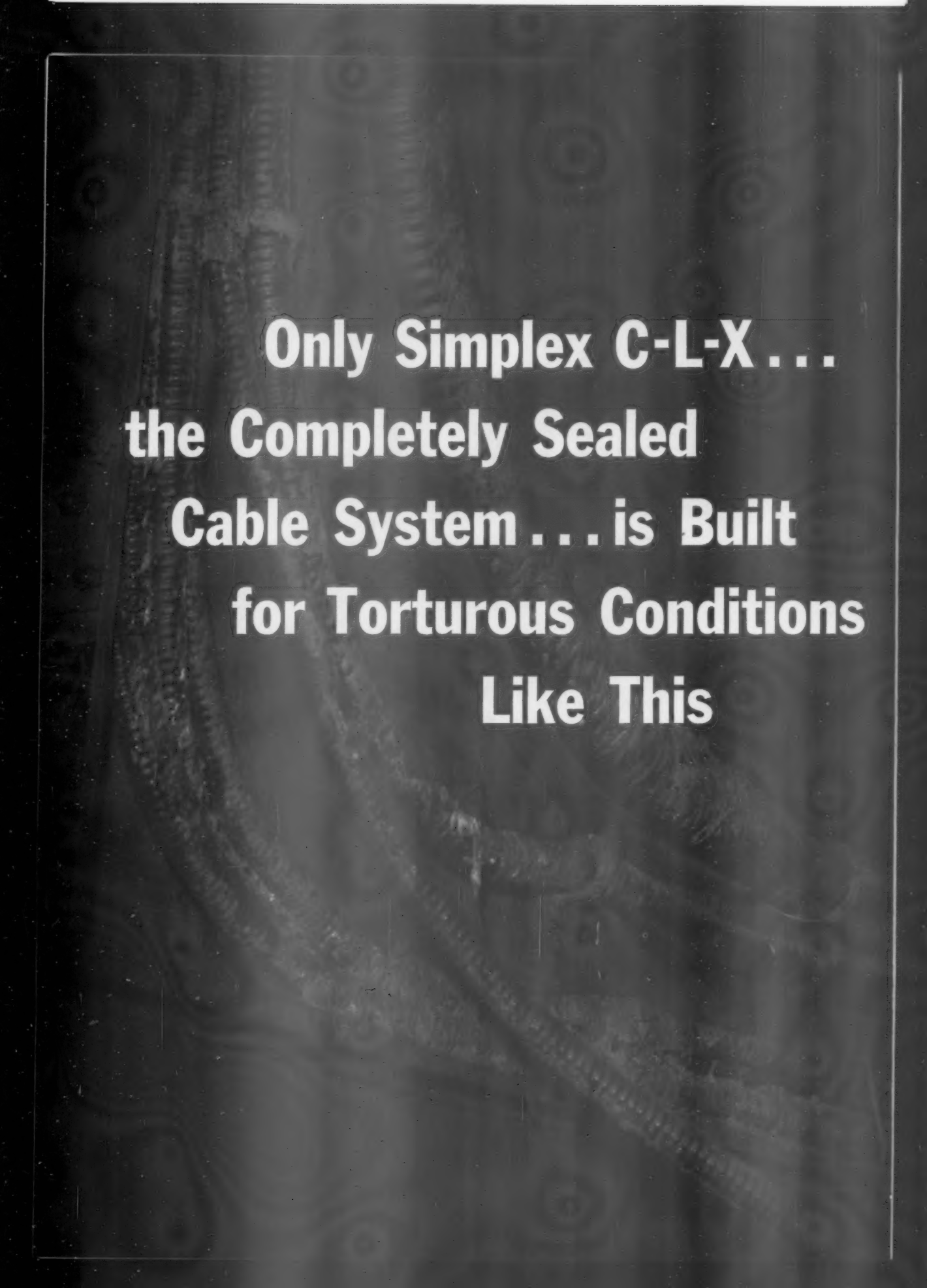
Only Simplex C-L-X . . .
the Completely Sealed
Cable System . . . is Built
for Torturous Conditions
Like This

*Simplex C-L-X combines cable and duct in one integrated system*

Metal, in the form of a continuous flat strip, is formed into a welded tube around the insulated cable. The metal tube is then corrugated to form Simplex C-L-X.

Simplex

# C-L-X

- Completely sealed to prevent penetration of liquids and gases.
- Protected against mechanical damage by a continuous, corrugated metallic sheath.
- As pliable as unsheathed cable because of its corrugated design.
- Requires no separate duct or conduit in any environment.
- Nonferrous sheaths can be designed to function as grounds or shielding.

The cable you see here is *not* interlocked armor. It is Simplex' new C-L-X . . . the completely sealed cable system.

C-L-X is insulated cable enclosed in a continuous corrugated metallic sheath. It is impervious to liquids and gases, is highly resistant to crushing, cutting and other forms of mechanical damage, and is as pliable as unsheathed cable of the same size and insulating compound.

Simplex C-L-X requires no separate duct or conduit, and can be installed in a continuous run regardless of the number of bends. Available with sheaths of steel, aluminum, copper or bronze, and with or without outer plastic jacketing, Simplex C-L-X provides the ideal solution for almost any installation, particularly those in which cable life is limited by severe ambient conditions.

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Simplex

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Cambridge, Mass. • Newington, N. H.

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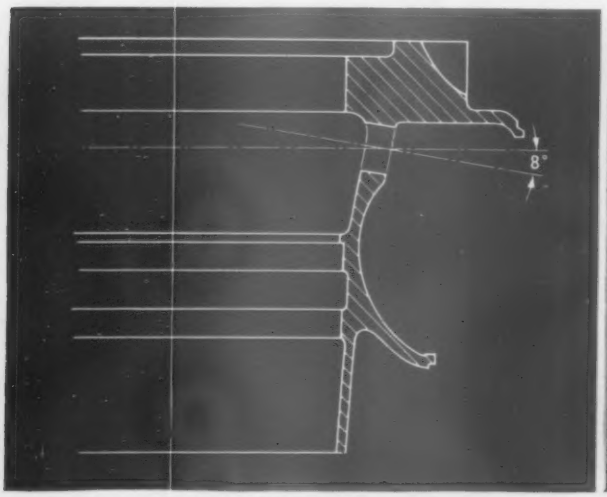
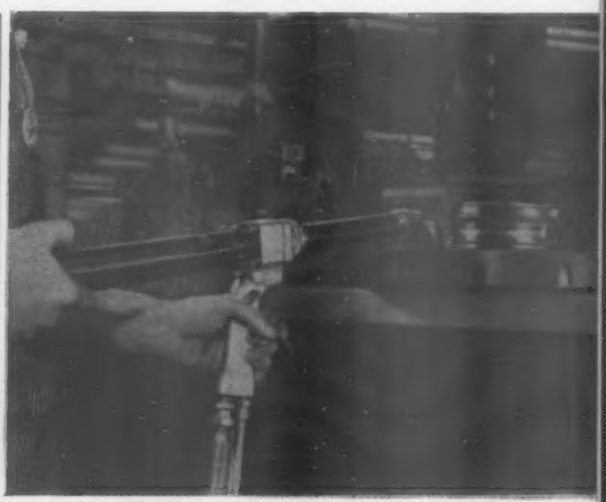
# How one aircraft parts subcontractor solved a tough production problem




*Sectional drawing showing the inclination of hole at 8° to center line. Center lines of holes are required to be true within .010".*



*Close-up of Broach Gun, jig and fixture, showing ease of operation.*

**PROBLEM:** MAKE 90 HOLES .281" SQUARE IN 13" DIAMETER STAINLESS STEEL RING TO ±.005" TOLERANCE

**SOLUTION:** USE CP PORTABLE BROACH GUN AND AN INEXPENSIVE FIXTURE

B. H. Aircraft Co., Inc., of Farmingdale, N. Y., is making a missile engine thrust chamber component for a major engine manufacturer. The problem of producing such close tolerance square holes could have been a major stumbling block. However, by using a CP Portable Broach Gun and a simple jig and fixture, these components are being produced in quantity with ***never a reject!***

*Right: Broaching operation at B. H. Aircraft Co., Inc., showing simple jig and fixture. The portability of the CP Broach Gun and its self-contained Power Cell makes this an easy one-man operation.*

Chicago Pneumatic 8 East 44th Street, New York 17, N. Y.

PNEUMATIC TOOLS • ELECTRIC TOOLS • AIR COMPRESSORS • DIESEL ENGINES • HYDRAULIC TOOLS • AVIATION ACCESSORIES

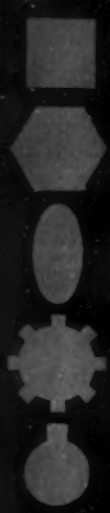


FACTORY

*Completed part, with broach used to finish holes to .281" square.*

# Here are some of the things you can do with the NEW CP Portable Broach Gun

## CONVERT ROUND PILOT HOLES TO THESE SHAPES:



SQUARE

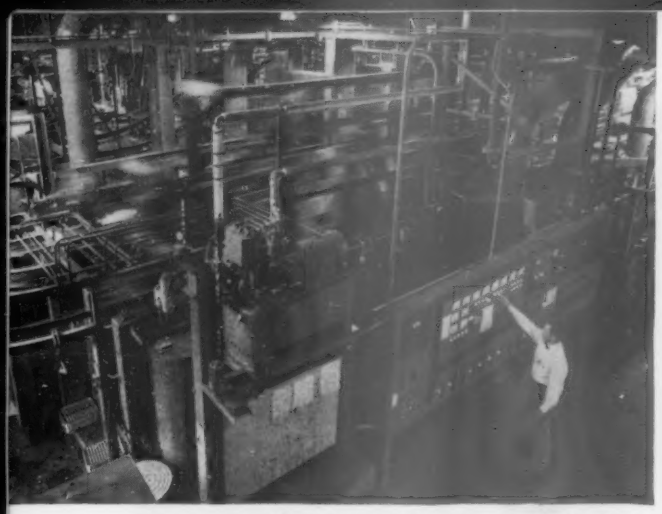
HEX

OVAL

SPLINED

KEYED

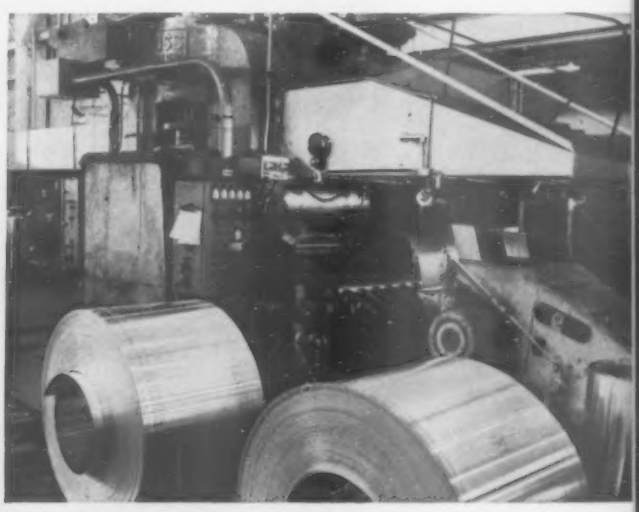
Using the CP Portable Broach Gun gives you a completely new technique in broaching. You take the tool to the work. Broach is inserted in round pilot hole and one squeeze of the trigger forms and finishes the hole. The broach pulls a clean, "mirror" finished hole, every time to ± .0002" accuracy. Self-contained CP Power Cell weighs only 58 pounds, operates on shop air lines and furnishes oil pressure up to 7,000 psi.



Extensive use of versatile Gulf Harmony oil in this electric range plant made possible a big reduction in the number of oils used. Shown in foreground is the hydraulic system where Gulf Harmony is used as hydraulic medium.

In steel mills, Gulfcrown Grease E.P. cuts maintenance costs because of its ability to withstand high temperatures and extreme pressure. Here Gulfcrown Grease E.P. is used in the lubrication of work rolls and table rolls.

Gulfcrown Grease, a Gulf E.P. Lubricant and Gulf Harmony oil keep downtime to a minimum on this 850-ton press. It turns out electric range bodies (flat) at the rate of 300 an hour.



Gear drives in this aluminum rolling mill are assured longer service life with Gulf E.P. Lubricants. In the mill's hydraulic system, Gulf Harmony oil's resistance to oxidation and rust preventive properties cut maintenance costs.

## Gulf® multi-purpose greases and oils simplify lubrication,

# GULF MAKES THINGS

At a large electric range plant, a Gulf Engineer set up a simplified lubrication program. As a result, the number of oils and greases was reduced from dozens down to only 6. Now, 3 oilers service the entire production line with its thousands of lubrication points.

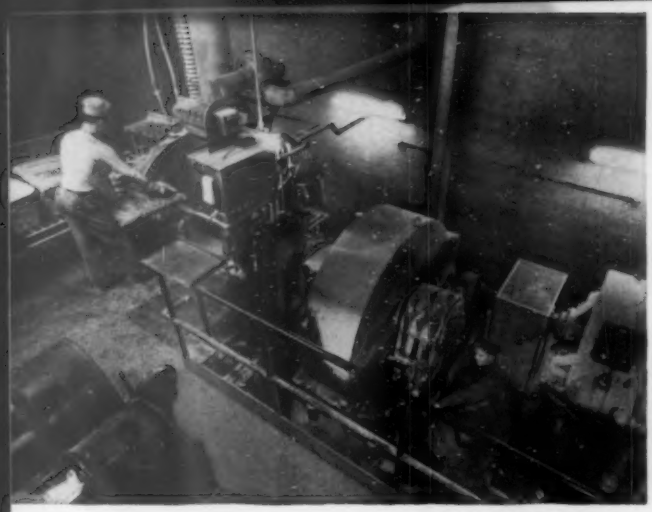
A rubber hose manufacturing plant has been following a Gulf-planned lubrication program for the past 10 years. Downtime has been reduced more than 30% on 300 basic processing machines and hundreds of auxiliary units, using only 6 Gulf greases and 3 Gulf oils.

And so it goes. In plant after plant, Gulf has set up simplified lubrication programs that have helped to solve complex lubrication problems and reduce costs with only a few basic oils and greases. The most versatile of these outstanding multi-purpose Gulf lubricants are:

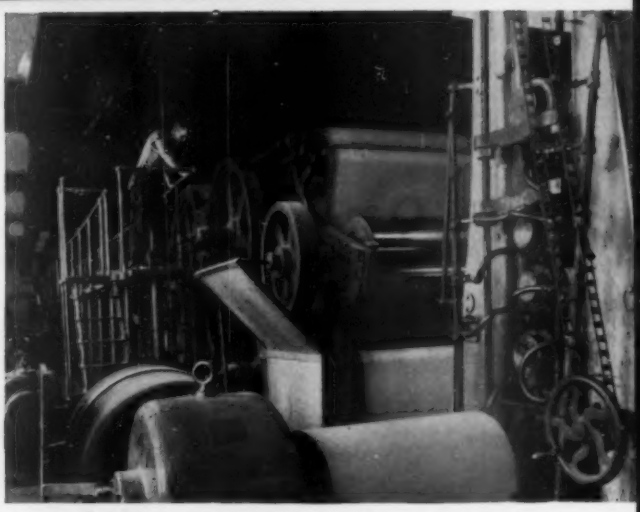
**Gulf Harmony® oil**—ideal for hydraulic systems, air compressors, blowers, dryer-roll bearings, machine tools, electric motors, central circulating systems, and many other applications.

**Gulfcrown® Grease**—a general-purpose lubricant for virtually any application where extreme pressure characteristics are not required.

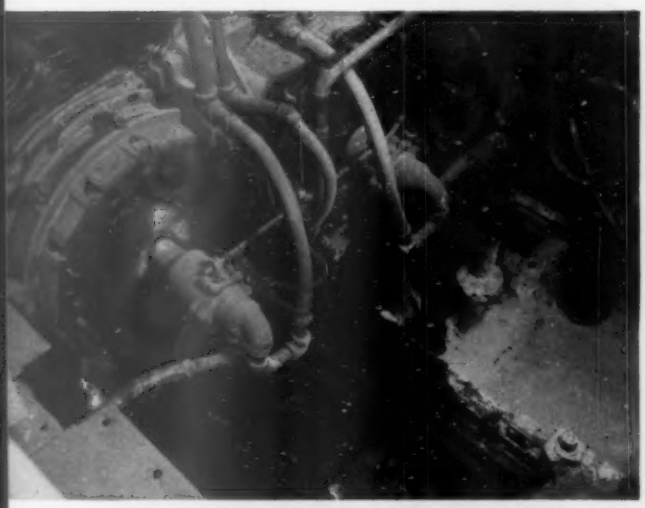
**Gulfcrown® Grease E.P.**—a superior lithium-base



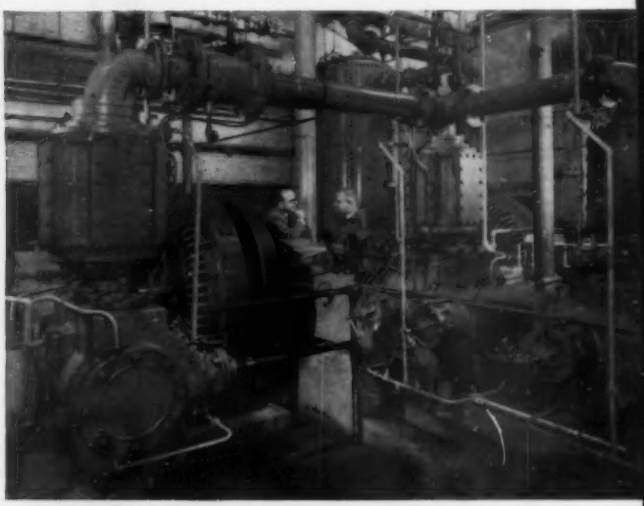
Gulf lubricants helped cut downtime more than 30% in this rubber hose plant. With Gulfcrown Grease and Gulf Harmony oil, this spiral flow mixer hasn't had a mechanical breakdown in 10 years due to a lubrication problem.



Using Gulf Harmony oil and Gulfcrown Grease for critical bearing lubrication, this paper mill has logged 15,000 hours without downtime due to lubrication. At the same time, lube inventories were reduced from 39 types to 13.



Heavy bearing loads exist in these main bearings of a Banbury Mixer. Gulfcrown Grease E.P., a superior lithium-base grease, lubricates here with high mechanical stability which resists costly breakdowns.



Compressor units like these are protected against premature wear and excessive maintenance costs when lubricated with Gulf Harmony oil. Units are also assured longer life and are kept free from harmful sludge deposits.

## cut costs . . .

# RUN BETTER!

grease specially developed for use where heavy bearing and gear loads exist . . . where shock loads may occur . . . where machine element action is oscillating.

**Gulf® E.P. Lubricants**—a group of gear-drive lubricants with superior film strength. In many cases, one grade of lower viscosity can do the job of several mineral oils of higher viscosities.

Perhaps these versatile Gulf lubricants can help cut maintenance costs and simplify lubricant storage and handling in your plant. Just call a Gulf Sales Engineer at your nearest Gulf office. Or, write for product literature.

**GULF OIL CORPORATION**
Department DM, Gulf Building
Houston 1, Texas

GULF

For more facts Circle 403 on Reader Service Card

# *Electric Trucks REDUCE NOISE LEVELS*

Quiet operation of battery-powered electric trucks eliminates distraction and annoyance to workers performing other production work. Quiet operation is an outstanding advantage when it is necessary to give verbal instructions to truck operators or to signal them by a dispatch system. Finally, quiet battery-powered electric truck operation is a valuable safety factor—the operator can concentrate better on activity around him.

Add quietness to a convincing list of other benefits—lower operating cost, less maintenance, clean and safe operation—and you can see why users prefer electric trucks for modern, efficient materials handling.

Electric truck users generally agree on one other point, too—Gould Batteries for longer life. With the vital new Silconic Plate, Gould Batteries offer up to 25% longer life through prevention of grid corrosion.

Join the list of satisfied users who prefer this ideal combination of battery-powered electric trucks and Gould Batteries. For more complete information, write or call the local Gould representative nearest you. Ask for booklet "Why We Use Battery-Electric Industrial Trucks." Gould-National Batteries, Inc., Trenton 7, N. J. In Canada, write to Gould-National Batteries of Canada, Ltd., 1819 Yonge Street, Toronto, Ontario.

*More Power to you from* **GOULD**



**For more facts Circle 404 on Reader Service Card**

# we admit it!

**Cleco design engineers do stick their noses in your business!**

Our design staff **does** know a lot about your operation. They have to. Their job is to design the air tools you need **almost before you need them.** They must design top performing tools that are simple to operate. Economical to maintain. Tools to stay on the job shift after shift. Tools that fit into the production plans of automated factories . . . specialized, custom-production operations as well. What's more, Cleco tool designers must think quality all the way, because every Cleco air tool has built-in quality. It's part of the Cleco® "Quality Control Package."

CLECO
AIR TOOLS

*"quality tools engineered for industrial progress"*

A Division of **REED ROLLER BIT COMPANY** • **P. O. BOX 2119** • **HOUSTON 1, TEXAS, U.S.A.**

IN CANADA: Cleco Pneumatic Tool Company of Canada, Ltd., 927 Millwood Road, Leaside (Toronto), Ontario

# Choose the . . . ATLAS COPCO COMPRESSOR

## that meets your needs best!

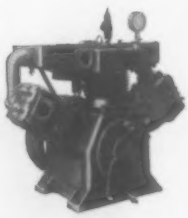
No one compressor can meet everyone's demands. However, there **is** an Atlas Copco compressor that will fit your requirements and no matter which you select, you'll get these specific advantages:

First, Atlas Copco compressors cost less to operate—consume less power per cubic foot of air produced than comparable units. Secondly, maintenance problems are at a minimum. One user reports a $3.10 expenditure after 10,000 hours' operation. And thirdly, you're **guaranteed** the free-air delivery we quote you—no "almost's" or "close to's". You get what you order!

Check the representative models shown here and then mail the coupon for a free catalog showing all the facts and figures! (No obligation, of course.)

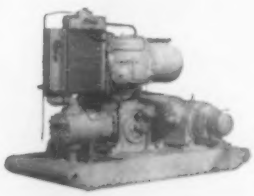
**ER-6 Heavy-Duty Compressors**

New! Fundamental improvements provide these three big advantages: (1) Only 18.3 hp required per 100 cfm at 100 psi, full load—10 to 15% **lower** than most compressors of this size! (2) Completely enclosed functional design protects external lines and fittings. (3) Extremely small space and simple concrete block required for permanent fixing—save on floor space, material and labor! Capacities to 1,140 cfm.



**CT Air-Cooled Compressors**

Stationary, or skid-mounted compressors for use where air demand is between 50 and 300 cfm. Totally air-cooled. Cylinder arrangement designed for smooth, vibration-free operation. Compact, rugged—for continuous, 24-hour trouble-free service. Highly efficient; low on maintenance costs.

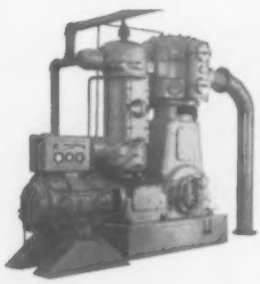


**AR-L Heavy-Duty Compressors**

Same basic construction as the AR Series, but provided with an air-cooled intercooler and air-cooled radiator for the cylinder water. Fan on compressor flywheel cools radiators. Perfect for arid areas or where difficult to bring in water. Both stationary and skid-mounted models available.

## FREE!

Write today for your free copy of our short-form catalog, describing the line of Atlas Copco stationary compressors. Ask, too, for detailed information on the model you need most. Use the handy coupon below.



**AR Heavy-Duty Compressors**

More air per horsepower than any comparable compressor! For continuous, full-load operation. "L" angle, 2-stage, double acting. Water cooled. Standard models provide 382 to 3210 cfm free-air delivery at 100 psi; only 76-590 hp required! (Can be supplied for other working pressures on request.)

**ATLAS COPCO**
**Dept. F-6, 545 Fifth Avenue**
**New York 17, N.Y.**

Gentlemen:

Please send me ☐ Short-form catalog
☐ Detailed information on the _____ Series

Name _____ Title _____

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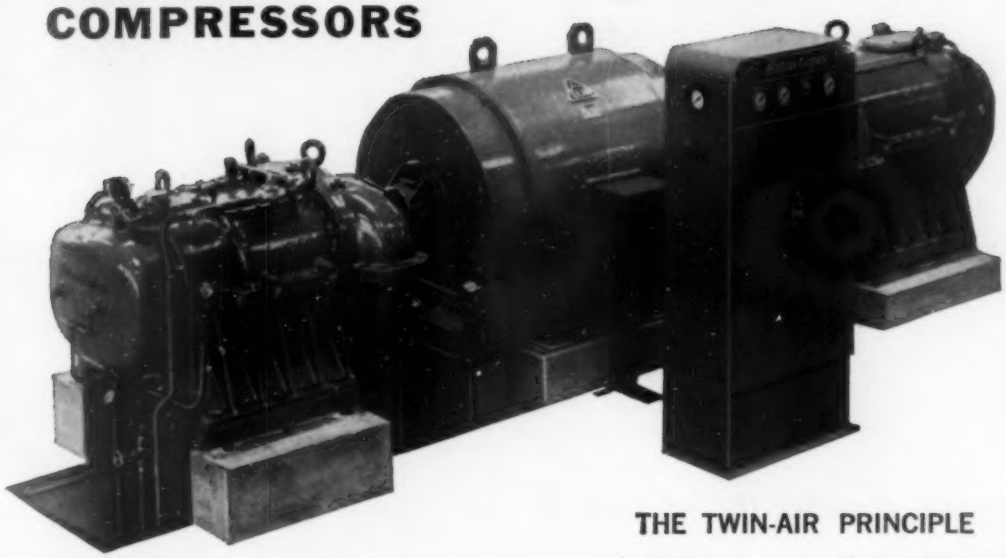
*Atlas Copco* *Atlas Copco*

# REVOLUTIONARY!

## TWIN-AIR COMPRESSORS

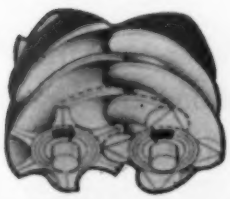


A basic departure in compressor design, employing precision-mounted helical rotors, with small clearances maintained by timing gears, thus eliminating friction (and the necessity for oil) in the compression chamber. "Twin-Air" Compressors offer surge-free delivery from 6,000 to 19,400 cfm at working pressures up to 115 psi. And, you get completely oil-free delivery of air or gas, since no lubrication is required!

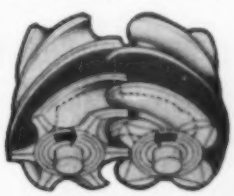
**OPERATION: Air Intake:** Air is drawn through the inlet into the space between lobes and housing. **Compression:** Motor revolves, sealing inlet and beginning compression of the enclosed air. Rotary motion continues, producing smooth compression, until each groove in turn reaches outlet port. **Air Outlet:** Pulsation-free compressed air is forced smoothly out of compressor and outlet is set again for the next cycle.

### THE TWIN-AIR PRINCIPLE

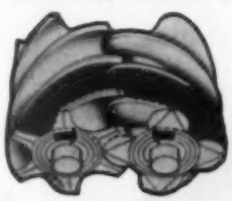
1. air in



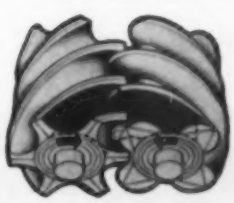
2. compression



3. compression



4. air out



**Atlas Copco**

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610 Industrial Avenue
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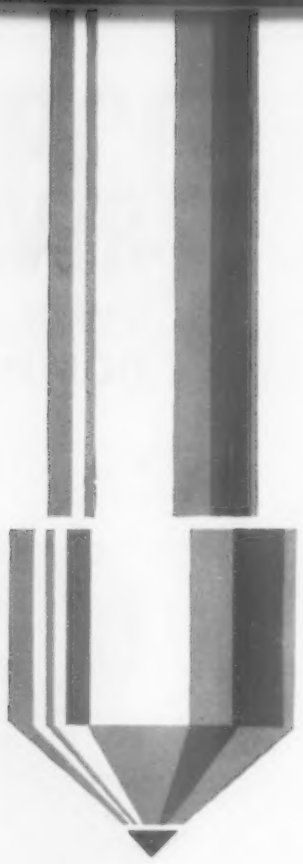
*Diamond-impregnated tool*



*Truing tool*

*When you consider the job they do,*

## DIAMONDS CAN BE YOUR CHEAPEST CUTTING TOOLS

It's true that diamond tools may *seem* costly. But the real cost of any tool is the first cost divided by the work it does.

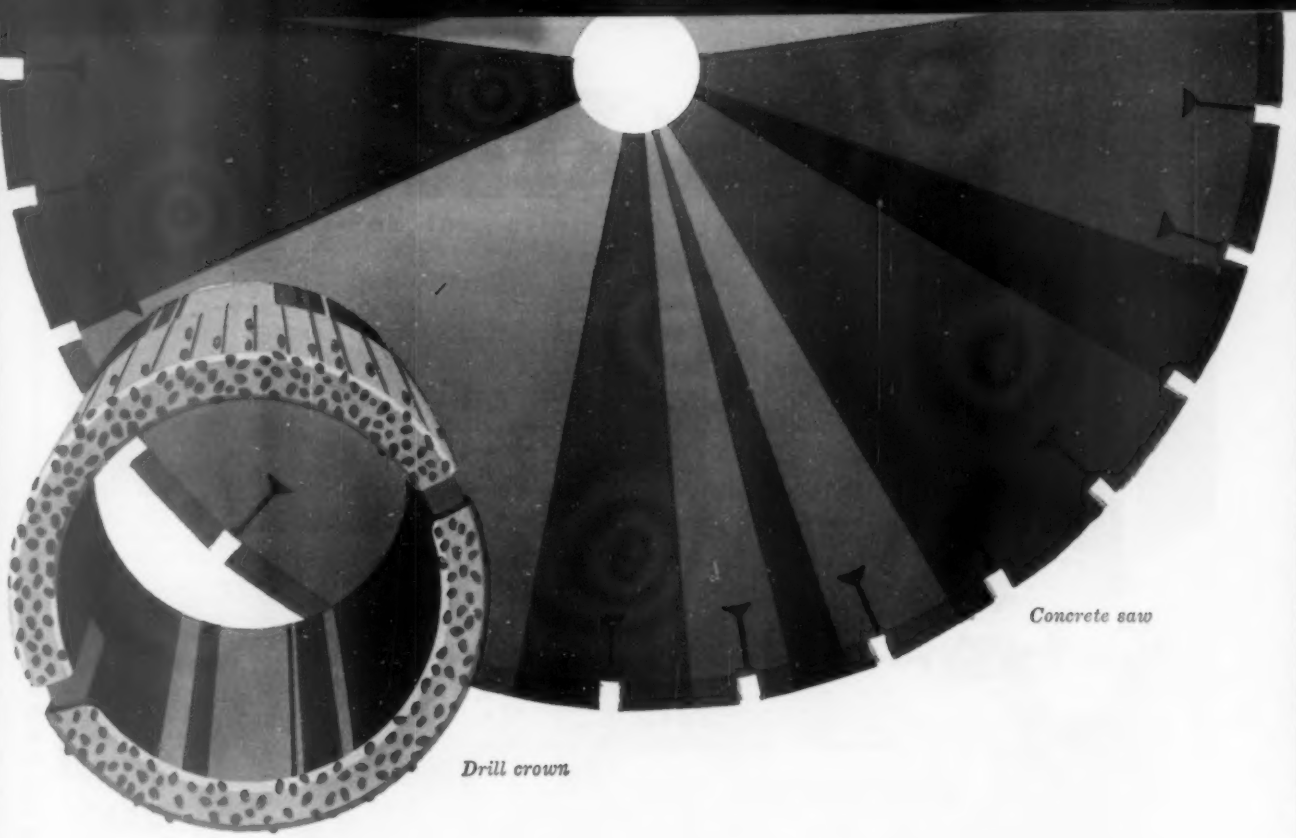
And diamonds usually work at higher speeds, do the job more quickly. Diamonds last longer, so tools don't have to be changed as often. Setups are reduced. Your people spend less of their time changing tools, more of their time operating machines.

*Grinding wheel*

*Engraving tool*

*Centering drill*

**Circle 407 on Reader Service Card**



*Concrete saw*

*Drill crown*

Just how inexpensive diamonds can be for you, depends on the job you're doing. You'll have to try them to know. The biggest companies in the country, the ones that watch costs most closely, use industrial diamonds consistently.

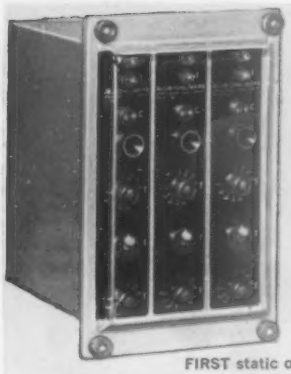
Next time you buy tools or wheels, try diamonds. Pit them against the cutting method you are now using. Chances are you'll find out how economical a diamond can be.

**INDUSTRIAL DISTRIBUTORS (SALES), LTD., LONDON**

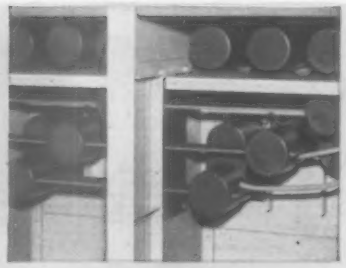
*Diamond shaping tool*

**INDUSTRIAL DIAMONDS CUT PRACTICALLY EVERYTHING . . .**
**ESPECIALLY YOUR PRODUCTION COSTS**

# ALLIS-CHALMERS



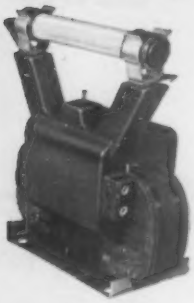
FIRST static overcurrent relays



FIRST with track-resistant, glass polyester insulation with primary stud and bus joint

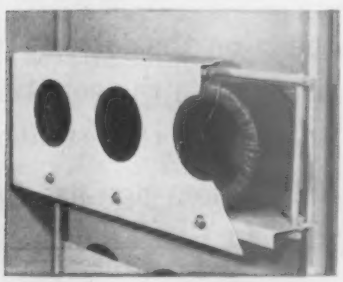
FIRST eye-level instrumentation switchgear

FIRST Aluma-Clad walk-in aisle switchgear



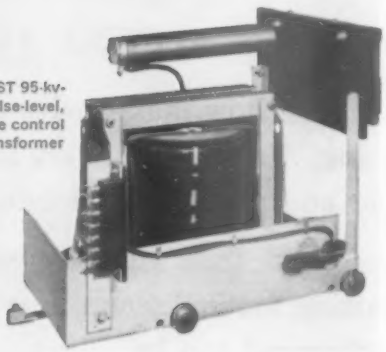
FIRST epoxy-resin potential transformers, trunnion mounted

FIRST front-access current transformers



1ST

FIRST 95-kv-impulse-level, dry-type control power transformer



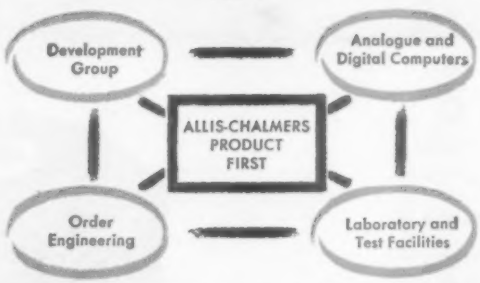
## ...from the company that put

# Progress in Switchgear

**For 113 years Allis-Chalmers has built a reputation for the finest products in the industry.** A-C is continuously developing new ideas, new techniques and new products to serve you better. This same leadership spirit has quickened the pace of switchgear progress. It's responsible for the firsts illustrated above. These testify to one company's research and engineering *action.*

There are still better things to come in switchgear. You'll get them all when you specify better switchgear . . . designed, built and *guaranteed* by **Allis-Chalmers,** Power Equipment Division, Milwaukee 1, Wisconsin. A-1357

*Aluma-Clad* is an Allis-Chalmers trademark.




**Intradepartment teamwork** bridges all gaps . . . smoothly integrates information, machines and men . . . speeding overall progress in Allis-Chalmers switchgear.

# DRAWING BOARD NEWS.....No. 1

Published by Chart-Pak, Inc., originator of the tape method of drafting

## CHART-PAK PRESSURE-SENSITIVE TAPES TAKE THE PRESSURE OFF DRAFTSMEN... You don't draw lines...

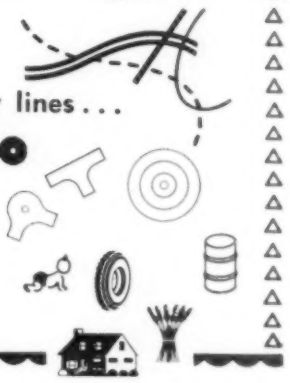
bars ... shapes ... symbols.

**You tape 'em on, eliminate hours of drudgery!**

Chart-Pak is a revolutionary new method using pressure-sensitive materials to simplify the production of drawings, graphs, charts, schematics and other visual presentations.

With Chart-Pak, you no longer have to draw and ink-in many of the curves, lines, bars, shapes, patterns and symbols in a drawing. You get them pre-printed on precision-slit Chart-Pak tapes and sheets, and just press them down!

Chart-Pak frees the creative draftsman for more important things.



## CORRECTIONS EASY TO MAKE WITH GOOF-PROOF CHART-PAK TAPE

"Peels off slick and quick" veteran draftsmen say.

There's no such thing as a mistake you can't fix, with Chart-Pak! If a line or symbol is in the wrong place, you can lift it up and replace it where you want it. Chart-Pak materials don't come off by themselves. They take all the normal punishment you give a drawing, including repeated trips through hot reproduction machines. Yet, they peel off slick and quick when you want them to.

## NEW DRAFTING FILM WON'T STRETCH, SHRINK, PUCKER

Both expert draftsmen and blueprinters say Chart-Pak's new FUTURA Drafting Film is the most satisfactory medium available. It is made of DuPont Cronar (R), for exceptional resistance to heat, cracking, tearing or soiling. It is finished with a mechanically-produced mat surface, on one or both sides — that takes pen and pencil beautifully — reduces smudging or feathering — erases easily. FUTURA has exceptional clarity and dimensional stability. Samples on request.

REDUCES SMUDGING

HIGH TEAR STRENGTH

## CHART-PAK develops new glare-proof tapes

Now for the first time — you can get matte-surface acetate-fibre tapes that won't "talk back" to a camera with highlights or glare. These ingenious Chart-Pak tapes provide a non-reflective surface, without excess thickness.

You have a thin, one-piece tape that won't reflect, cast shadows, separate, shrink, yellow or peel — in many colors, widths and patterns. Use Chart-Pak *matte-surface* tapes, wherever glare is a problem.

## NEW FOLDER TO HELP YOU TAKE DRUDGERY OUT OF CHARTS, GRAPHS

Write for complete information on this new system that makes drafting easier . . . rush jobs neater: Ask for free folder —"Visualization Made Easier."

*WRITE WITH AN ORDINARY PEN OR PENCIL TO...*

**CHART-PAK, INC.**

ORIGINATOR OF THE TAPE METHOD OF DRAFTING

101 River Road, Leeds, Massachusetts

Dealers in all principal cities

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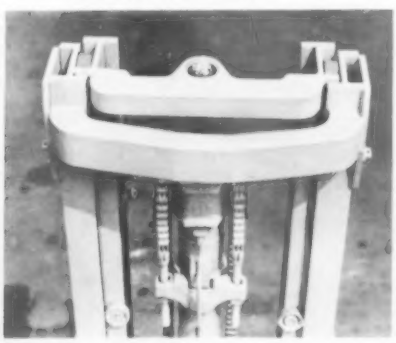
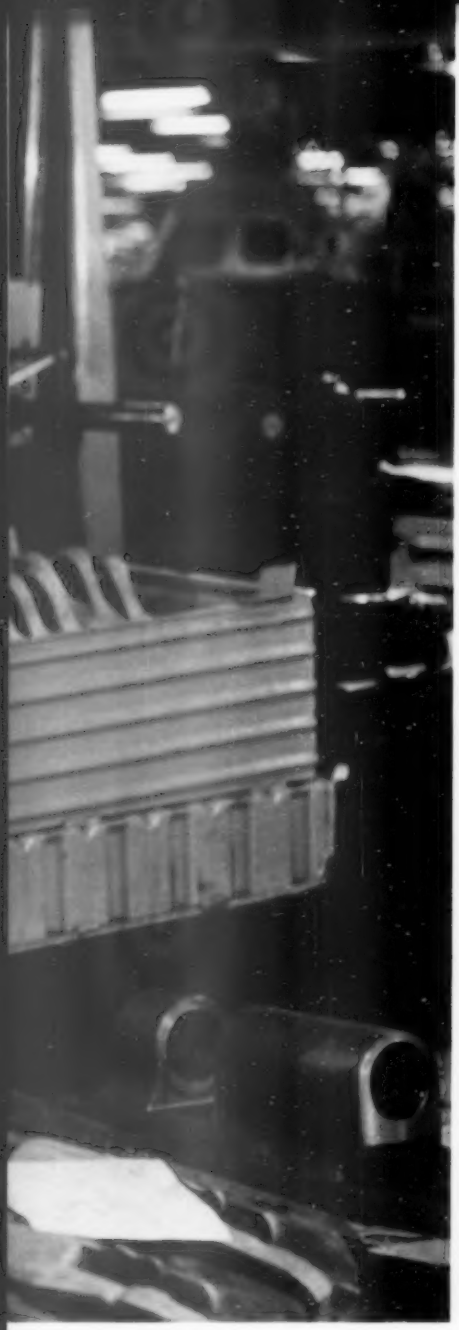
For more facts circle 410 on Reader Service Card →

**Fast, safe operation** • centrally located controls • protected instrument panel • separated ignition key and starter switch • reinforced steering column bracket • automotive type inching, brake pedals.

**Low seating position** on G54 speeds trailer loading and increases safety. Seating height of 37" and overall height of 71" affords the driver plenty of headroom for safer operation.

**Double I-beam on mast** affords greater strength and stability, and less deflection. Exclusive side thrust rollers for mast and carriage assure frictionless lifting action at all times.





# YALE OFFERS: FIRST COMPACT GAS LIFT TRUCKS

**• Solid or pneumatic-tired • 3000, 4000, 5000 lb. capacity • Gasoline or LP-Gas powered • 52 HP engine in solid-tired model, 72 HP engine in pneumatic-tired model • New, improved automatic torque transmission.**

You get compactness and speed for faster, safer operation cycle from the Yale G54 series gas trucks. Lifting is a job the Yale Compact does fast . . . from 75 to 80 FPM. Its controlled lowering speed ranges from 55 to 80 FPM. You have full lifting speed at all times, plus increased pump life, assured by the patented self-charged hydraulic tank. You easily adjust the exclusive mechanical inching control to your individual operational requirements. What's more, Yale Compact offers you greater safety, with self-energizing, self-adjusting brakes and wheels. Operation is easier and more efficient. You operate all hydraulic attachments of the Yale Compact with only one exclusive, multi-function control handle.

**Safe ride and shock reduction,** better stability, and a self-righting effect come from Yale's new steering axle design. Steering axle mounts on two 2" diameter articulating pins.

**Put this truck to work for you immediately, ask about Yale's own leasing plan. For more information, contact your Yale Representative, or write to: The Yale & Towne Manufacturing Company, Materials Handling Division, Philadelphia 15, Pa., Dept. G-006.**

**Yale Materials Handling Division, a division of The Yale & Towne Manufacturing Company. Manufacturing Plants: Philadelphia, Pa., Forrest City, Ark. Products: Gasoline, Electric, Diesel, and LP-Gas Industrial Lift Trucks. Worksavers • Warehousers • Hand Trucks • Industrial Tractor Shovels • Hand, Air, and Electric Hoists.**

YALE®

INDUSTRIAL LIFT TRUCKS
TRACTOR SHOVELS · HOISTS

YALE & TOWNE

Laminated wooden beams protected with a Sisalkraft paper. Picture courtesy of Unit Structures Incorporated, Peshtigo, Wisconsin.

# Flexible wraps to cut Packaging Costs from the ground up

Protecting odd or irregular shapes and sizes for shipment and storage need not be difficult or costly. Tough, waterproof *paper* reinforced for strength to prevent tearing is one answer. Sisalkraft makes this kind of paper. In addition, we polyethylene coat paper and paper-type materials . . . make vapor-proof, non-combustible papers, as well as many variations of paper, plastic and metallic foil combinations.

American Sisalkraft specializes in wraps and barriers, which, for example, provide protection against water and water-vapor, dust and dirt, heat or cold, grease and oil. For secure, speedier production line carton closure, we produce reinforced sealing tapes which permit 2-strip sealing. Tests indicate that this method is faster than gluing or stapling. For complete information, please write our main office in Attleboro, Mass. We'll be glad to work with you.

**SISALKRAFT**

**AMERICAN SISALKRAFT CORPORATION**

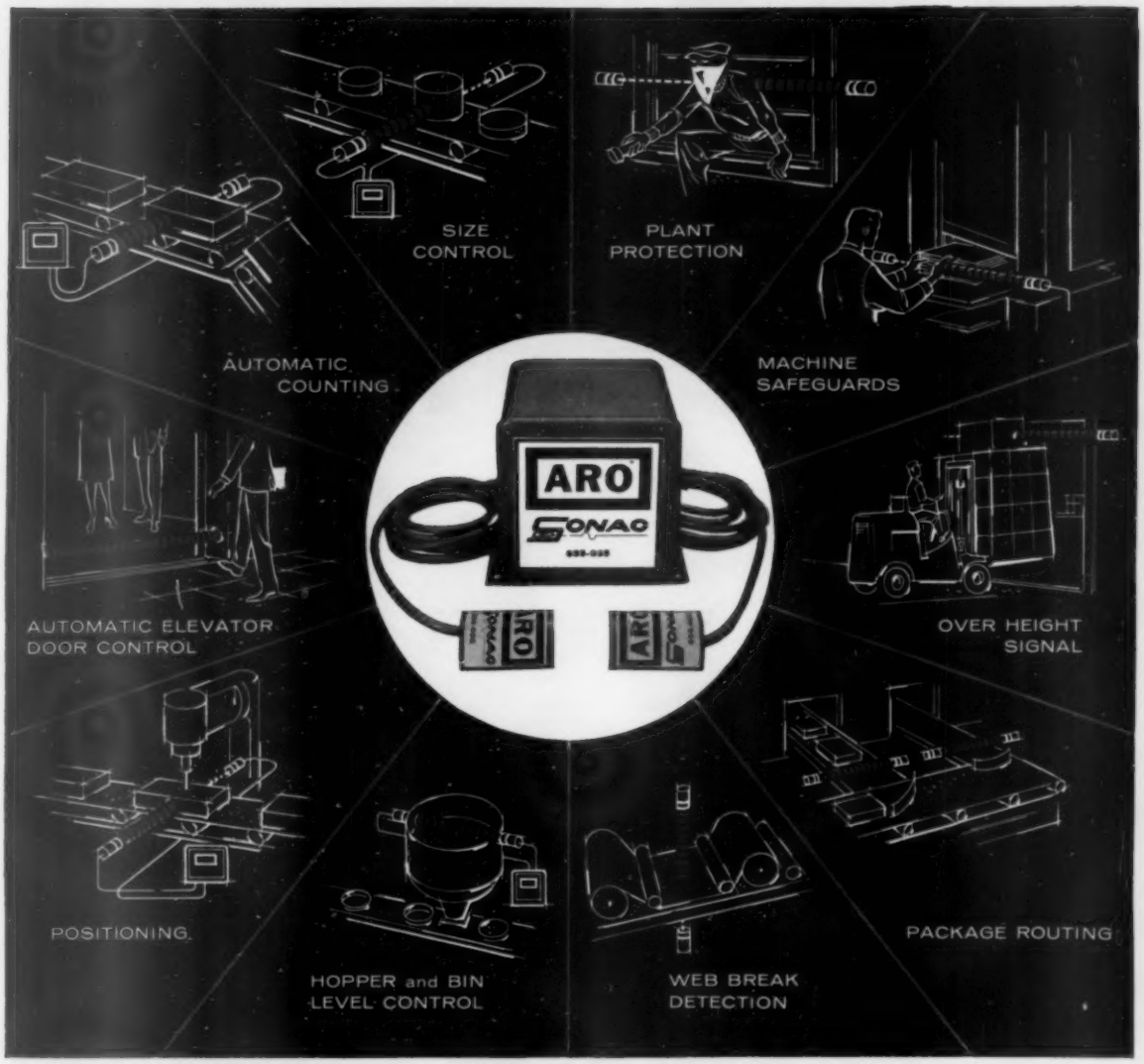
Chicago 6 • New York 17 • San Francisco 5
In Canada: Murray-Brantford Ltd., Montreal

*reinforced paper, foil and plastics for construction, industrial packaging and agriculture*

# This is SONAC

PATENTS PENDING

## New Ultrasonic Automatic Control By ARO




Sonac's beam of ultrasonic sound waves will sense, count, control or monitor under conditions that foil other sensing and switching devices. Sonac doesn't need to see . . . requires no light of any kind . . . will work in contaminated atmosphere, darkness, and can even be piped through flexible hose or tubing. Sonac is unaffected by industrial vibration. Fully transistorized amplifier and hermetically sealed sensor construction require no maintenance. Easy to install. For complete information on Aro's new Sonac Ultrasonic Control, call, wire or write Aro today.

ARO®

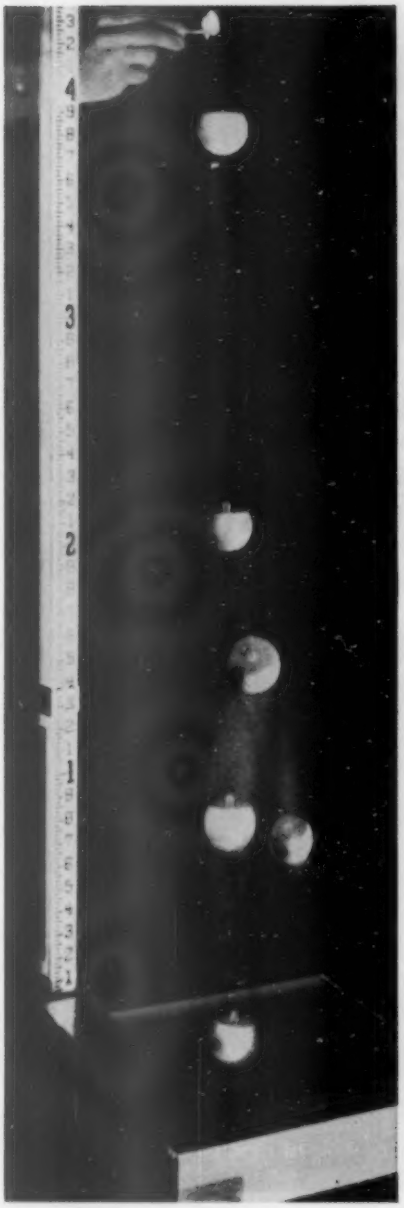
**THE ARO EQUIPMENT CORPORATION**
**Bryan, Ohio**

Aro of California, 3141 S. Grand Ave., Los Angeles 7, Calif.
Aro Equipment of Canada Ltd., Rexdale (Toronto), Ontario
Offices in All Principal Cities

# The answer to a maintenance man's prayer . . .

**END WINDOW BREAKAGE PROBLEM FOREVER WITH JOHNS-MANVILLE CORRULUX.** When you glaze with Johns-Manville Corrulux, worries about window breakage end forever. Corrulux is strong, impact-resistant, yet provides efficient, diffused daylighting.

# . . . Johns-Manville CORRULUX



**SHATTER-PROOF!** When a 2½ inch steel ball weighing 2.06 pounds was dropped from 4 feet, no damage was done to a Structural Grade Corrulux Flat Pane. The ball bounced approximately 1½ feet.

**EASY TO WORK . . . EASY TO HANDLE.** For special shapes and sizes, Corrulux may be cut with a power saw, hacksaw or handsaw. It drills and fastens just as readily. No tricks to learn. Light and easy to handle, Corrulux Flat Panes come in sizes to fit most windows.

**EASY TO INSTALL.** Simply replace glass panes with flat panes of shatter-proof Corrulux. They install as easy as glass, yet protect against future damage from storms, vibration, vandalism and other hazards. And Corrulux eliminates glare, spotlighting and harsh shadows because it diffuses light at all angles as it admits over 80% of the light that strikes its surface.

**WHERE TO GET IT.** Pioneer in its field, Johns-Manville Corrulux offers you the finest translucent panel on the market consistent with an economical price. For further details, see the Yellow Pages under *Plastics*, or write Johns-Manville, Box 158, Dept. FA 960, New York 16, N. Y. In Canada, address Plastics and Allied Building Products, Ltd., Dundas, Ontario.

JOHNS-MANVILLE

CORRULUX is a registered trademark of the Johns-Manville Corporation

JOHNS-MANVILLE JM PRODUCTS



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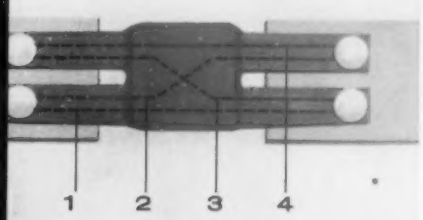
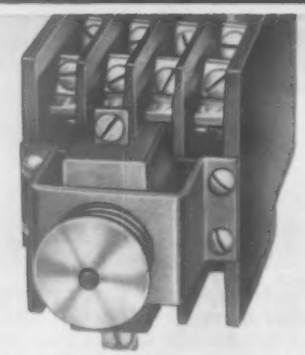
**Another Cutler-Hammer first!** Up to 24 poles in an area less than the size of a dollar bill.

**New contact reliability.** Parallel bifurcated contacts, which allow four current paths instead of one, provide infinitely greater circuit reliability . . . liberally designed so any current path carries full relay rating.



**At last! "Mechanical memory" latch** as reliable as the relay itself! No adjustment ever needed. Add latch at any time.

**New simplified design!** Cutaway view shows basic simplicity. Coil vacuum impregnated to resist damage from humidity, vibration, electrical stress. Terminals can be screw or spade type.

# Space savingest relay you've ever seen: New Cutler-Hammer "Compact 300"

*Versatile 300 V. control relay is so reliable it's permanently sealed!*

Here is the best answer yet to the need for an extremely reliable, small-size 300 V. industrial relay—the new Cutler-Hammer "Compact 300."

Every detail known that affects relay reliability has been improved in the "Compact 300." Bifurcated contacts which make possible *four* current paths rather than one, add millions of operations to the "Compact 300's" electrical reliability.

In fact, we're so confident of its electromechanical reliability, we permanently enclose the "Compact 300." And, if it should be damaged by a fault current, you throw it away and replace it with a new one. Its low price makes this an economical, practical maintenance procedure.

Now think of the space you can save with the "Compact 300." It controls up to eight circuits in panel space only 2″ wide by 2¾″ high. 2, 3, 4, 6 and 8 poles with any combination of N.O. or N.C. contacts are available, of course.

At any time, you can add "mechanical memory" latch with a life equal to the life of the relay. No adjustments are ever necessary. It's another exclusive! Better get full details on the new "Compact 300" now. Send for Pub. ED-L079-S211.

**What's new at Cutler-Hammer?** New, better products, like the 300 V. relay are coming steadily from our new, expanded plant facilities. We're ready now to help you take care of the great industrial growth of the future. If you are planning ahead and need electrical control assistance, contact the nearest Cutler-Hammer sales office.

*WHAT'S NEW? ASK...*

**CUTLER-HAMMER**

Cutler-Hammer Inc., Milwaukee, Wisconsin • Division: Airborne Instruments Laboratory • Subsidiary: Cutler-Hammer International, C. A. Associates: Canadian Cutler-Hammer, Ltd.; Cutler-Hammer Mexicana, S. A.

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Spray, dip, or flow coating . . .

# DeVilbiss total

## can help determine the best method for you

Large job or small, you get an unbiased recommendation from DeVilbiss for the coating method that will work best for you. For, DeVilbiss is the only company that manufactures a complete line of coating equipment—from individual spray guns to engineered finishing systems.

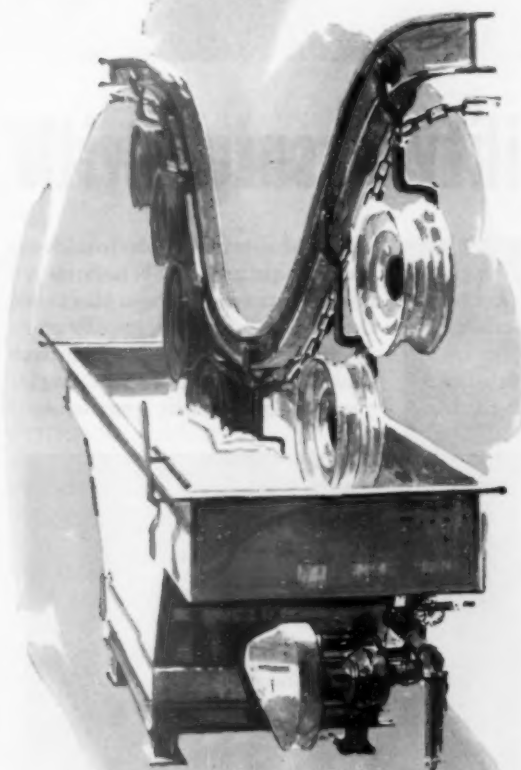
Trained engineers provide total service from initial planning to complete training of operational personnel. Furthermore, our customer research laboratory will run comparison tests of your products for actual results that reveal what method is best for you. Or DeVilbiss engineers will suggest ways to make your present system more efficient with minimum changes, and on-the-job operator training.

See how DeVilbiss total service can help you. Just contact our nearest representative or write: The DeVilbiss Company, Toledo 1, Ohio. Also Barrie, Ontario; São Paulo, Brazil; and London, England. Branch offices in principal cities.

# service

FOR TOTAL SERVICE, CALL

**DEVILBISS**



*Dip coating* *Continuous process or batch type, with scientific vapor and viscosity controls to ensure uniform finishes*

*Flow coating*

*Saves man power, floor space in prime- or single-coat applications*

*Spray coating*

*DeVilbiss manual and automatic equipment coats products of any size or shape quickly, economically*

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# MODERN MAINTENANCE

## IS PROFITABLE MAINTENANCE

R. L. Kirkpatrick, *Manager, Maintenance Sales,* Westinghouse Electric Corporation

### The Fourth Factor of Production ... The Maintenance Engineer

Many plant managements today are building their hopes, dreams—and profits—on a servant of enormous power and promise, automation. The automatic plant or production line means a complex of interrelated equipment including electric and electronic instrumentation, even computers. Once separate machines or production processes are now interdependent. Failure of equipment anywhere on the line brings production to an immediate and expensive slowdown or standstill. Unplanned outages can today cost 10 to 100 times what they did a few short years ago.

Management recognition of the basic need for production reliability is creating a new giant in the productive process . . . the maintenance engineer. In 1957, an increasingly automated industry counted 21% of its payroll in

# Production reliability assured with

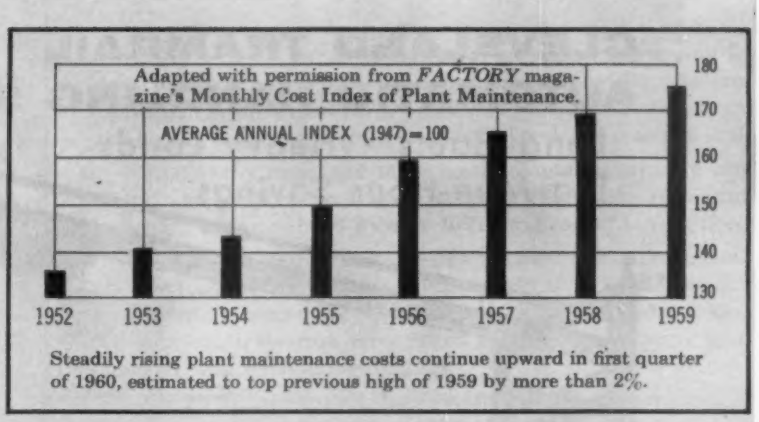
The necessity of keeping your electrical equipment operating at top efficiency becomes increasingly important as you increase the use of electrical energy and as the electrical equipment becomes more complex. Excessive down time or substandard production quality due to equipment failure can make the difference between profit and loss in your plant.

To help you keep your plant operating at a profit we offer you "Modern Maintenance." This is not a substitute for your own preventive maintenance program, but is designed to supplement it. We would like to have the opportunity of reviewing your present maintenance operation with you. By coordinating our program with yours, you can be assured of securing the lowest cost and most effective maintenance.

Our Modern Maintenance includes inspection, testing, modernization, field service, shop repair, and renewal part recommendations backed by highly trained specialists, up-to-date facilities and all the benefits of Westinghouse research and development.

Our maintenance specialists are men who know about the maintenance of electrical, electronic or steam equipment. When they repair a machine they check it thoroughly—both electrically and mechanically—and include in its repair every possible new development. In this way your equip-

Polyester glass banding is applied to armatures and wound rotors of various ratings with a special Westinghouse-developed tension device, insuring a strength factor equal to steel.




Steadily rising plant maintenance costs continue upward in first quarter of 1960, estimated to top previous high of 1959 by more than 2%.

maintenance personnel, 77% in production. Today, three years later, in its new plants, the proportion has changed to 50-50.

Emphasis on reliability has focused management's attention on the need for highly skilled men in the maintenance function. This means the accent is on selection and training, often extensive and highly specialized. The newly emergent maintenance man often is an engineer-technician, perhaps the most skilled workman in the shop. He is thoroughly conversant with all the equipment for which he is responsible. He is able to locate and eliminate trouble quickly. He is skilled in the all-important measures of preventive maintenance.

In short, maintenance is today one of the most important plant functions alongside power, labor and materials. Maintenance is considered a necessary part of the production process and must carry its share in producing a profit. Does your maintenance program contribute its share to your company's profit? It will pay you to find out.

# Westinghouse maintenance service

ment is not only repaired but modernized—actually made into better equipment than it was when it was new. For example, when these men rewind motors, they can use revolutionary insulation processes such as Super COILIFE* or Thermalastic® that give motors extra life—processes that were not developed when the motor was built years ago.

Fast repair service is available from our 42 Repair Plants that are equipped with the latest facilities and processes, with skilled craftsmen to rebuild and *modernize* your equipment.

Fast shipment of renewal parts is assured from our 46 warehouses strategically located in industry centers. Parts are generally shipped within hours after they are ordered. This allows you to make a substantial reduction in your parts inventory. Our maintenance specialists will gladly outline a minimum inventory to meet your operating requirements.

Fast, one-day delivery for renewal parts is guaranteed when you order from your local Westinghouse warehouse.

At the heart of this Modern Maintenance program is the periodic inspection and testing of your vital electrical and steam equipment by our highly trained maintenance specialists. This program covers complete electrical and mechanical inspection and testing.

We would like you to invite one of our Westinghouse sales engineers to talk with you and others concerned with electrical equipment maintenance in your plant. He will review your requirements and will draw up a proposed Modern Maintenance program tailored to your needs. He will also be interested in reviewing your present maintenance program and offer recommendations based on his broad experience in this field. He would like to have you and your people visit your local Westinghouse Repair Plant. J-95216

*Trade-Mark

Westinghouse



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# CLEVELAND TRAMRAIL AUTOMATIC HANDLING SYSTEMS

Long Hauls • Heavy Loads
Big Man-Hour Savings

ROBOT materials handling systems are here. Cleveland Tramrail has a wide variety of them in use in many plants. Some operate inside, some outside; some between machines, departments, or building floors; some between distant plants (as illustrated above). Some carriers travel between two points; others serve as many as 126 stations.

Operators are not needed for robot carriers. Pressing a button sends a carrier on its way. At the delivery point it stops automatically. After unloading and reloading, pressing another button returns it to the original station or to some other station as selected.

Cleveland Tramrail automatic carrier systems are available for loads of 1000 lbs. to 10 tons. They will lift loads to heights of 100 feet, if necessary, and carry them for practically any distance. Some carriers even unload and return automatically.

The man-hour-saving possibilities that Cleveland Tramrail Automatic Handling Systems offer you are tremendous—and there are other important advantages. It will pay you to get acquainted with this rapidly spreading idea of materials handling.

***GET THIS SPECIAL REPORT***
Write us for your free copy of "AUTOMATIC DISPATCH PORTFOLIO" Gives data on a variety of cost-reducing automatic handling installations.

**CLEVELAND TRAMRAIL DIVISION**
THE CLEVELAND CRANE & ENGINEERING CO.
3210 East 290 St., Wickliffe, Ohio

**CLEVELAND TRAMRAIL**
**OVERHEAD MATERIALS HANDLING EQUIPMENT**



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**ALEMITE BARREL-TO-BEARING LUBRICATION...**

# important tool of production!

***In today's*** costly, complex industrial operation, lubrication is more than a simple matter of maintenance! Actually, modern lubrication is an *important production tool* that cuts downtime and boosts production...reduces costs and prolongs machine life!

That's why more and more cost-conscious plant men are taking a long look at lubrication methods. The result—many are switching to years-ahead Alemite Barrel-to-Bearing Lubrication.

A complete Alemite Barrel-to-Bearing Method can be custom-planned for your plant. It can include electric, air or hand-operated equipment . . . everything required for high-pressure lubrication, filling hydraulic systems, servicing oil reservoirs, lubricating gear housings, and refilling grease guns.

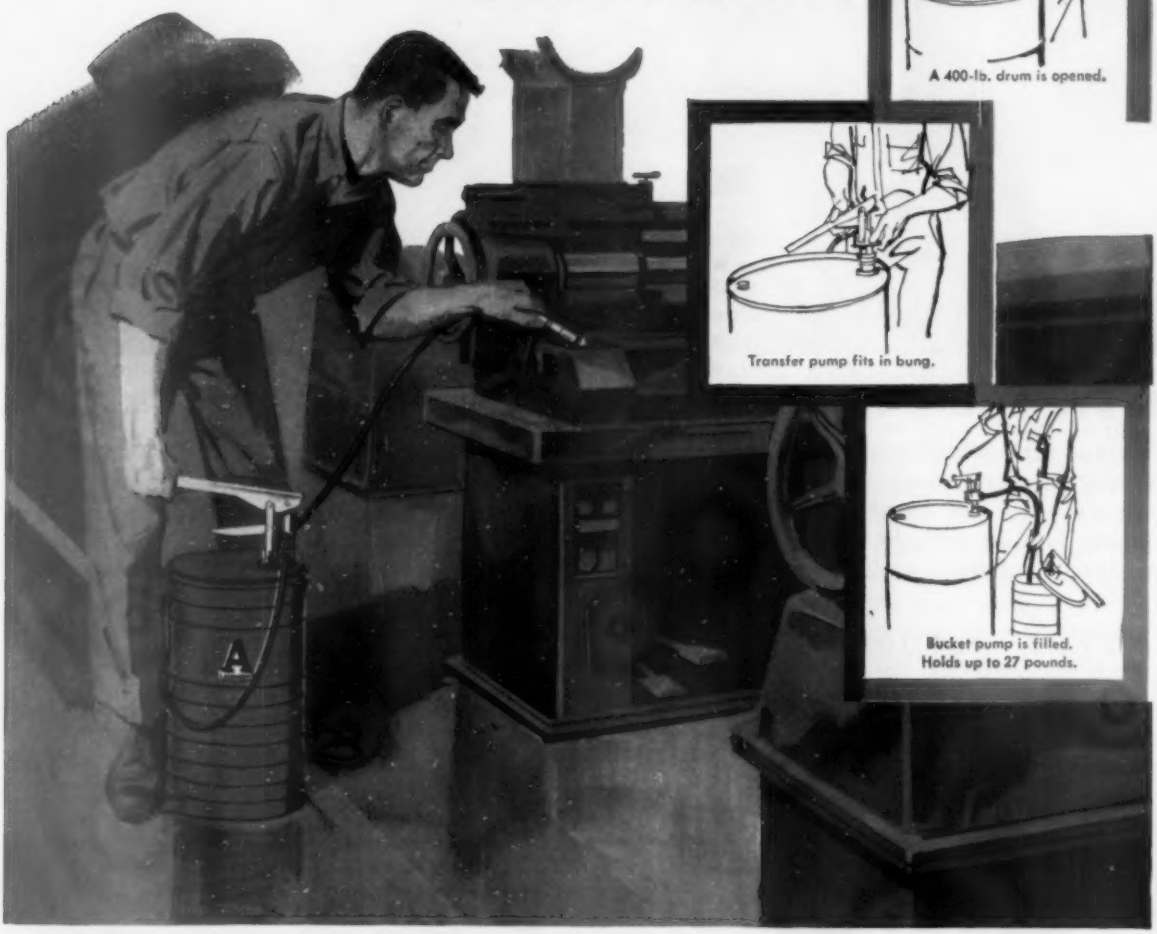
Let an Alemite expert show you how to get greater production at lower cost with modern, custom-planned lubrication—your important production tool!

***Write for free Alemite catalog today!***

Symbol of SW Excellence

**ALEMITE**
DIVISION
**STEWART-WARNER**
CORPORATION

Dept. E-90, 1850 Diversey Parkway, Chicago 14, Ill.



A 400-lb. drum is opened.



Transfer pump fits in bung.



Bucket pump is filled. Holds up to 27 pounds.

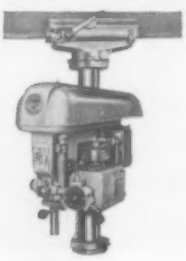
## NEVER BEFORE—UP FRONT CONTROL WITH ONE HAND OPERATION

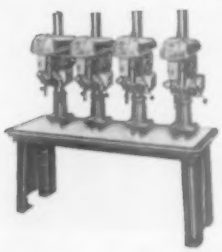
Unique pilot wheel control is mechanically integrated with the clutch control, allows operator to engage power feed with a simple wrist movement of one hand. Without any adjustments, operator can use rapid manual approach then power feed, skip drilling technique, straight power feed or straight manual feed. There are four feed ratios—.004, .006, .009 and .012 ipr—with each of five available spindle speeds.

## NEVER BEFORE—SUCH A COMPLETE CHOICE OF MODELS

Floor model

Bench model

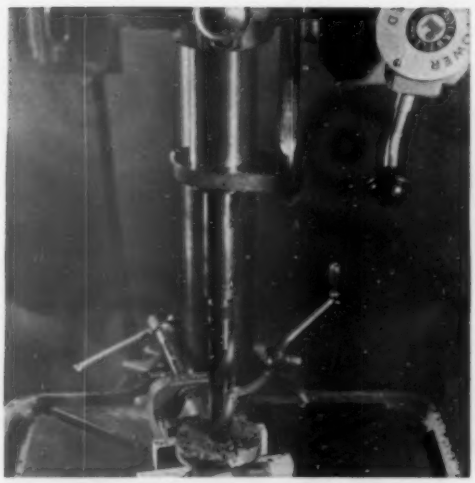

Overhead model


Multiple spindle model

# ROCKWELL ANNOUNCES . . .

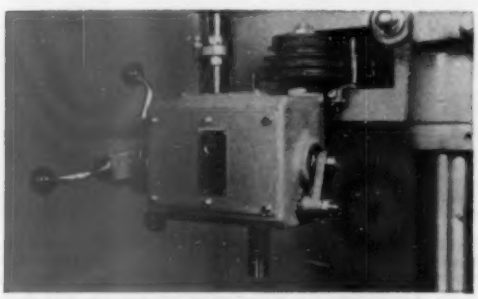
# NEW POWER FEED

## on famous DELTA 20" drill presses



**NEVER BEFORE—"JOB TAILORED" DRILL POINT PRESSURE**

A lathe-type cone clutch enables operator to adjust drill point pressure from 0 to maximum capacity of machine to permit power feeding on a production basis through a wide range of hole diameters. It furnishes power and thrust for drilling holes up to 1", yet delicately handles drills down to 1/16" diameter. Torque sensitive adjustability feature stops feed when overloaded—avoids drill breakage.



**NEVER BEFORE—REMOTE CONTROL AND AUTOMATION**

Actuating plunger, an extension of the clutch shaft, permits remote control which frees operator from manual effort. The power feed can be electrically, hydraulically, pneumatically, or mechanically interlocked with other machines or synchronized with devices such as rotary tables, clamps and work feeds for semi or full automatic operations.

Now Delta brings you advantages NEVER BEFORE AVAILABLE on a standard drill press—with the most advanced development in mechanical power feeds. Every model in the new Delta 20" drill press line offers power feed that gives you: *a front mounted pilot wheel for effortless one hand operation; infinitely adjustable drill point pressure; built-in feature that permits remote control or interlocking with automation devices.*

With the flexibility of feeds afforded by "flick of the wrist" control, operator's work is limited to loading, unloading, and actuating the tool. You get the adaptability of a power tool with the ruggedness, precision and capacity of a machine tool. Capable of handling production metalworking jobs done by machines costing much more, these new Delta power feed drill presses provide a simple, low cost method of increasing productivity and improving drilling quality.

Thoroughly tested through a rugged trial of 750,000 drilling cycles, Delta's new power feed line offers many other outstanding features and NEVER BEFORE AVAILABLE benefits that you cannot appreciate unless you see them demonstrated IN ACTION. Let your Delta Industrial Distributor show you how the 20" power feed drill press can help you cut costs (he's listed under "TOOLS" or "MACHINERY" in the Yellow Pages). Meanwhile, for FREE brochure giving details and specifications *plus* information on how to add New Power Feed to your present Delta 20" drill press, write: Rockwell Manufacturing Company, Delta Power Tool Division, 628J N. Lexington Avenue, Pittsburgh 8, Pa. In Canada: Rockwell Manufacturing Company of Canada, Ltd., Box 420, Guelph, Ontario.

DELTA INDUSTRIAL TOOLS

another fine product by

**ROCKWELL**

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# NEW RAPISTAN APC® CONVEYORS SERVE WHOLESALERS, RETAILERS, INDUSTRY

## A FINGER'S TOUCH

Industrial applications of Rapistan APC equipment include this wheel-type conveyor that moves freshly packed butter from the packaging area into the cooler. Orderly accumulation of cartons permits intermittent unloading under uncomfortable low-temperature conditions in the cooler.

Cartons are stopped without stopping the APC live-roller conveyor, a feature which makes APC an ideally suited conveyor for filling and packing operations involving accumulation of large, heavy items. In this situation, cartons are loaded and packed right on the conveyor line.

# accumulates packages with no pressure build-up!

And when you release your finger, only the first carton moves . . . then the next . . . etc. This is SINGULATION, another exclusive Rapistan APC (Adjustable Pressure) Conveyor feature providing much lower power requirements and longer belt life. Combined with low-pressure accumulation under power, the result is a conveyor that safely handles any mixture of carton and container sizes and shapes. Fragile materials can share the ride with heavy, bulky materials without harm. Complete safety is assured for operating personnel, containers and contents. Production and handling efficiency and low-cost operation result. Detailed information on how Rapistan APC Conveyor, both wheel and live-roller types, are benefitting every type and variety of industrial, service and distribution operation is available for the asking.

Rapistan APC (Adjustable Pressure) Conveyor plays an important part in the distribution of incoming merchandise in this department store. Accumulation, checking and sorting processes are served with exceptional efficiency in distributing goods to marking and sales storage areas in the large store.

One of the original live-roller APC conveyor installations by Rapids-Standard is this beer warehousing operation. Cases can be seen moving at orderly intervals on the left and accumulating under power without pressure build-up. Hands are easily and safely inserted between cases for removal from line.

Rapistan®

**The RAPIDS-STANDARD COMPANY, Inc.**
694 RAPISTAN BUILDING
GRAND RAPIDS 2, MICHIGAN



**For more facts Circle 420 on Reader Service Card**

# HOW GOODYEAR KEEPS CLOSE TABS ON QUALITY WITH MULTI-STUB TAGS

***These three Dennison-produced tags are quality control tools*** at the Goodyear Tire & Rubber Company, Akron, Ohio. One has 12 stubs that control hose production and wage payments as well as 100% inspection. The other two have 3 stubs for initiating sample tests and for following through afterwards. These hard-working tags are typical of the dozens of wisely planned tag forms used by Goodyear. Together, they systematize work progress from receipt of crude rubber to shipment of hose, tires, conveyor belts and other quality-controlled products of "The Greatest Name in Rubber".

***Multi-stub tags simplify systems at lowest practical cost*** when Dennison becomes your paperwork partner. Your tag forms cover vital information in the most orderly way . . . as you'd expect from America's first and largest source of patched tags. And, because Dennison-designed automatic machines integrate clear printing, strong patching, clean die-cutting and sharp perforating in a single high-speed sequence, Dennison delivers highest quality at lowest cost.

***A free analysis of your tag systems*** with design suggestions and cost quotations is yours for the asking. Benefit from the longest experience in system-mating tags by contacting Dennison first.

**Dennison**

*Helping you compete more effectively*

FRAMINGHAM, MASSACHUSETTS

*Sales offices in principal cities*




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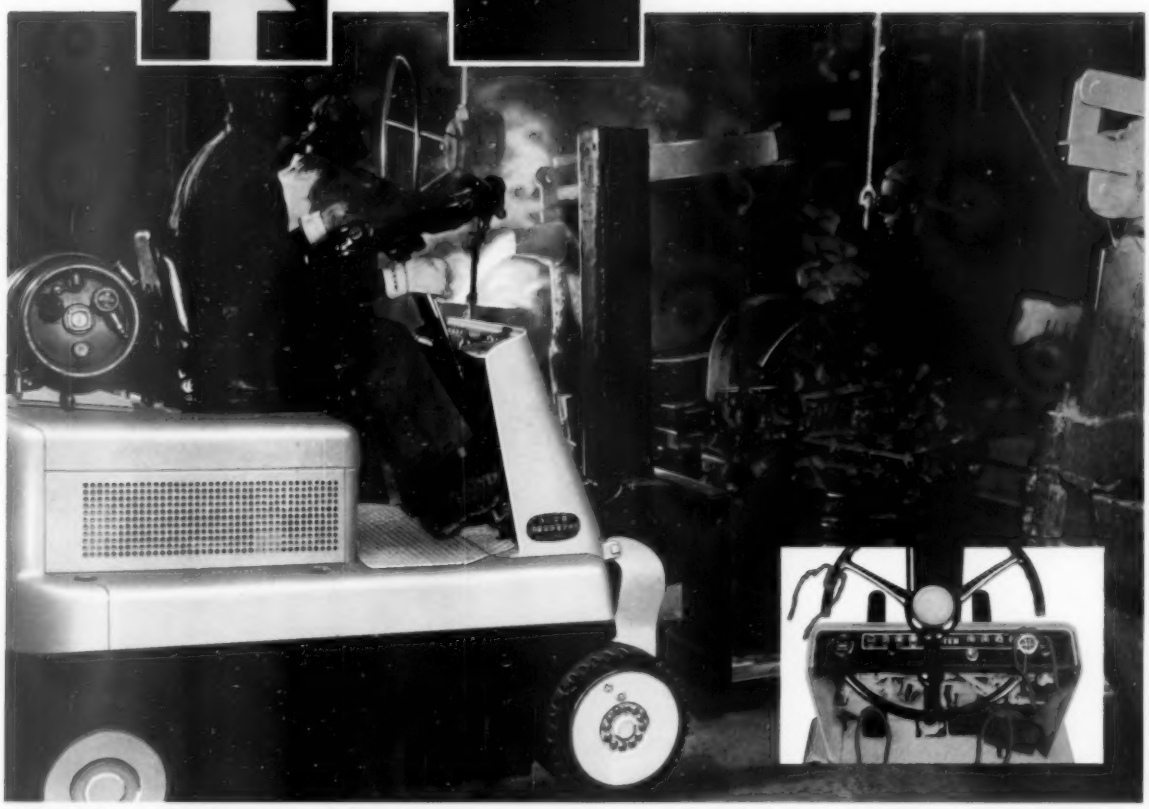
# HYSTER



Monomast high visibility upright—a Hyster exclusive.

## monotrol speeds production handling

*Only*

## HYSTER® has it!

**At American-Standard Plumbing & Heating Division**—Hyster lift truck with Monotrol control handles millions of pounds per month—in brass foundry at Cincinnati, Ohio.

All driving functions except steering are foot controlled—for safe, rapid handling.

Right foot Monotrol pedal controls power—forward-reverse—Hystamatic transmission. Left foot controls brakes and truck inching. Hands are free for steering and load control.

Safest, easiest trucks to drive. Quickest to service—cheapest to maintain.

Call your Hyster dealer or write for literature.

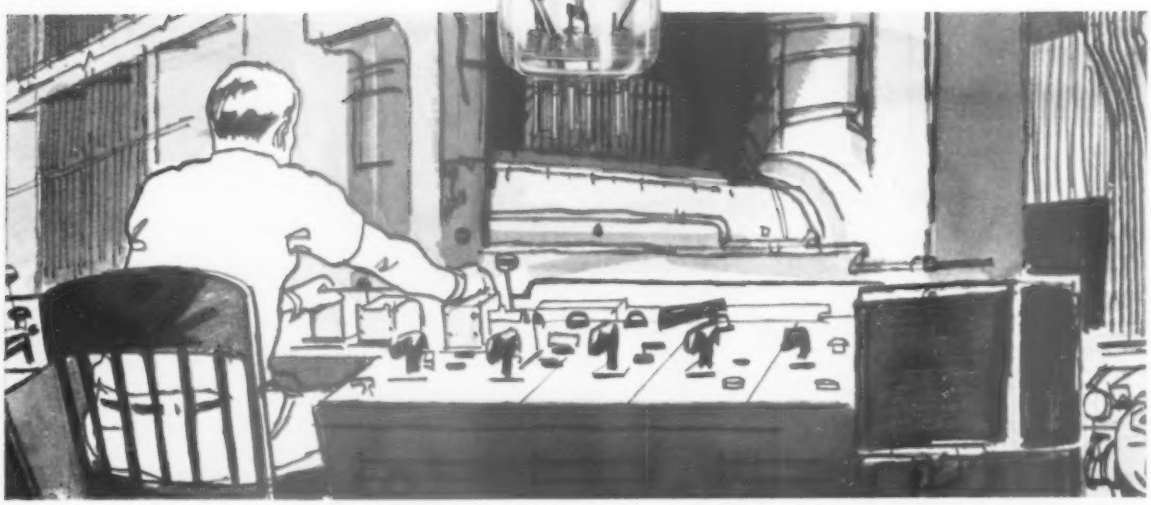
INDUSTRIAL TRUCK DIVISION—Lift trucks, mobile cranes, straddle carriers
TRACTOR EQUIPMENT DIVISION—Construction and logging equipment
MARTIN TRAILER DIVISION—Heavy machinery hauling trailers
INTERNATIONAL DIVISION—Overseas manufacturing, sales and service
Factories: Portland, Oregon (Home Office) • Danville, Ill. • Peoria, Ill. • Kewanee, Ill. • Nijmegen, The Netherlands • Glasgow, Scotland • Sao Paulo, Brazil • Sydney, Australia (Licensee)

HYSTER

**HYSTER COMPANY**
INDUSTRIAL TRUCK DIVISION
P. O. Box 847 • Danville, Illinois

# SYLVANIA INDUSTRIAL TUBES

*take the loads reliably*



Sylvania Industrial Electronic Tubes prove their ability in daily use to withstand widely varying load conditions. Vibration? Shock? They're built to take that, too, and still perform reliably.

Next time you need superior-quality replacement tubes see your *Sylvania Industrial Tube Distributor*. Better yet, see him soon and have your replacements on hand. He handles the full line of Sylvania Industrial Tubes for resistance welding, electronic control, induction heating and dielectric heating equipment.

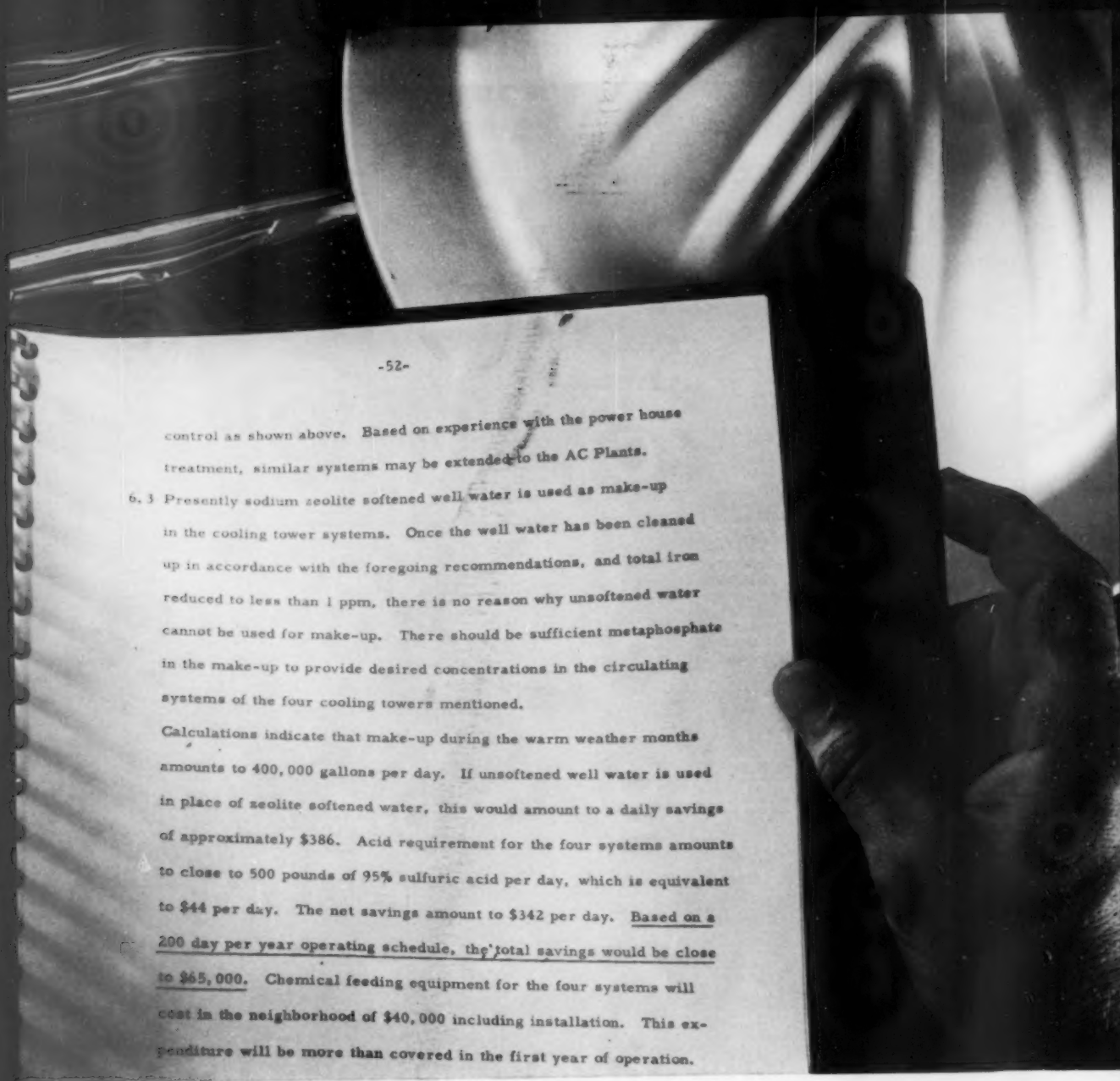
Meet your SYLVANIA INDUSTRIAL TUBE DISTRIBUTOR. Ask him for the new "Sylvania Industrial Tubes" and "Gold Brand Reliable Tubes" booklets. Or write Electronic Tubes Division, Sylvania Electric Products Inc., Dept. 249, 1100 Main Street, Buffalo, N. Y.

**POPULAR SYLVANIA GAS TUBES FOR CONTROL APPLICATIONS**

| Sylvania Type | Starting Voltage | Operating Voltage | Operating Current (ma) Min. | Max. |
|---|---|---|---|---|
| **VOLTAGE-REGULATOR TYPES** | | | | |
| 0A2 | 155 | 150 | 5 | 30 |
| 0B2 | 115 | 105 | 5 | 40 |
| 0B3 | 125 | 90 | 5 | 30 |
| 0C3 | 135 | 105 | 5 | 40 |
| 0D3 | 180 | 150 | 5 | 40 |
| 5644 | 130 | 95 | 5 | 25 |
| **VOLTAGE-REFERENCE TYPES** | | | | |
| 5651 | 115 | 87 | 1.5 | 3.5 |
| 6308 | 115 | 87 | 1.5 | 3.5 |

SYLVANIA

*Subsidiary of* **GENERAL TELEPHONE & ELECTRONICS**



-52-

control as shown above. Based on experience with the power house treatment, similar systems may be extended to the AC Plants.

6.3 Presently sodium zeolite softened well water is used as make-up in the cooling tower systems. Once the well water has been cleaned up in accordance with the foregoing recommendations, and total iron reduced to less than 1 ppm, there is no reason why unsoftened water cannot be used for make-up. There should be sufficient metaphosphate in the make-up to provide desired concentrations in the circulating systems of the four cooling towers mentioned.

Calculations indicate that make-up during the warm weather months amounts to 400,000 gallons per day. If unsoftened well water is used in place of zeolite softened water, this would amount to a daily savings of approximately $386. Acid requirement for the four systems amounts to close to 500 pounds of 95% sulfuric acid per day, which is equivalent to $44 per day. The net savings amount to $342 per day. Based on a 200 day per year operating schedule, the total savings would be close to $65,000. Chemical feeding equipment for the four systems will cost in the neighborhood of $40,000 including installation. This expenditure will be more than covered in the first year of operation.


# How to cut cooling water costs...

was a real problem for a major oil company. The principal water source was a series of wells located 25 miles from the plant. The well water was of poor quality and the 25-mile trip through a 20-inch main laid over desert country added iron to make the water even worse.

Hall Laboratories, working with plant personnel, developed treatment methods which not only solved the cooling water problem, but involved a potential savings in chemical costs of $65,000 annually. The Hall report, quoted above, was a comprehensive survey, including recommendations for the most efficient use of water throughout the plant. Management adopted the recommendations, and has been extremely pleased with the results.

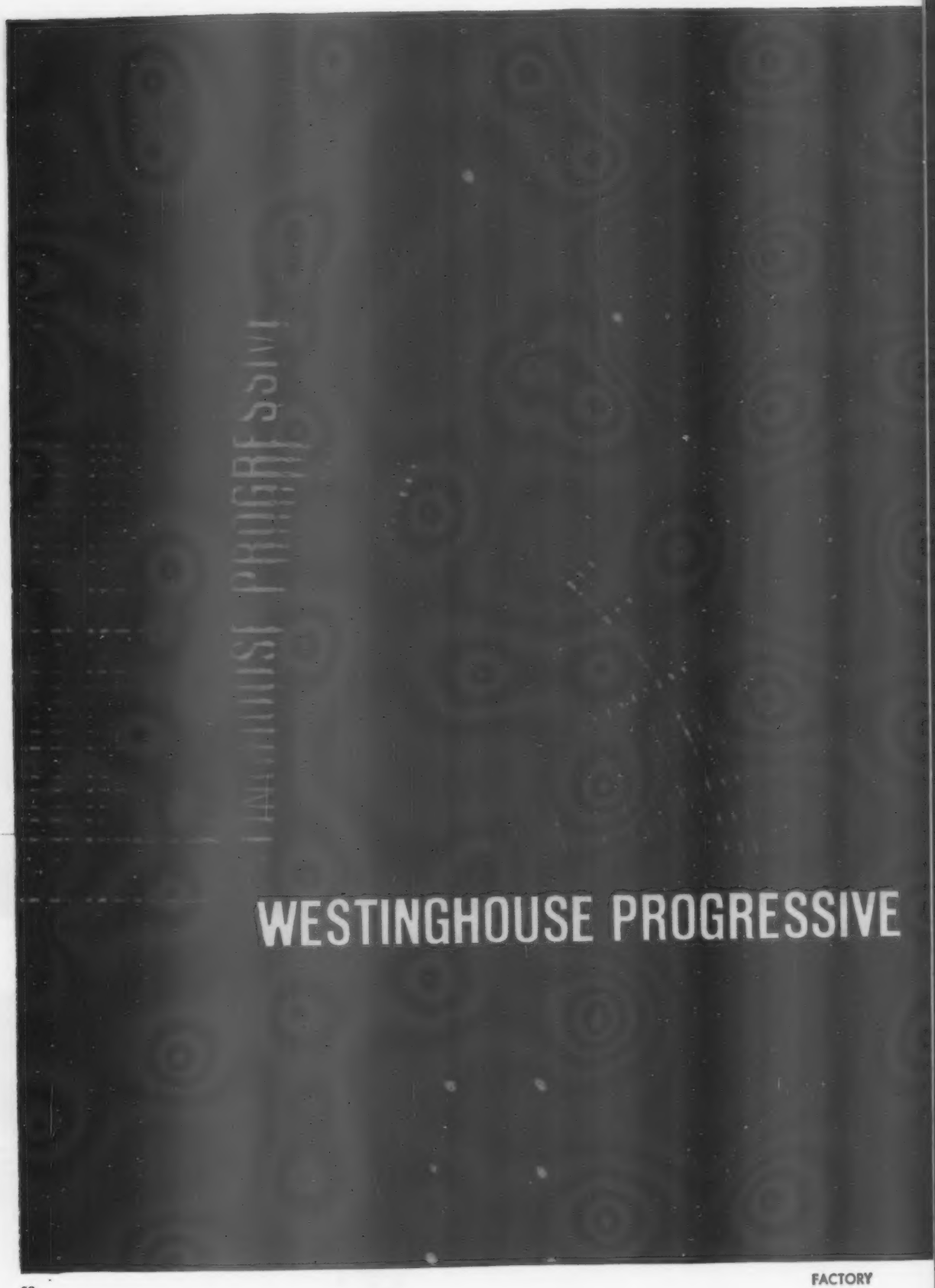
A close look at your utilization of water may reveal many areas where money can be saved, or productive capacity increased. Hall can help you find the most efficient way to use water . . . your most important raw material.

**HALL LABORATORIES**
HAGAN CENTER, PITTSBURGH 30, PA.
**Consultants on the Procurement, Treatment, Use and Disposal of Industrial Water**

**Want to know more about Hall? A request on your company letterhead will bring this new Hall brochure.**

DIVISION OF **HAGAN** CHEMICALS & CONTROLS, INC.

**For more facts Circle 423 on Reader Service Card**


WESTINGHOUSE PROGRESSIVE

WESTINGHOUSE
PROGRESSIVE AUTOMATION
CAN HELP YOU IMPROVE
OUTPUT, PROFITS
THROUGH COORDINATED
AUTOMATIC PRODUCTION

# AUTOMATION

Westinghouse *Progressive Automation* is a long-term plan leading to automated production with minimum capitalization. It is designed to help manufacturers gain better product quality through step-by-step control of operations.

In fact, *Progressive Automation* has already been carried to its logical conclusion: completely automatic production. In the steel industry alone, three computer-controlled systems have been sold. Here the entire drive systems, supplied by Westinghouse, provide coordination of rolling mill operations under the command of a computer.

**AUTOMATION... STEP BY STEP**—Westinghouse is ready to work with you in planning economical steps to automatic operations . . . without under- or over-automating. Step-by-step automation starts with the many modern Westinghouse controls, motors and drives at work in plants today. Each was designed to achieve an immediate production objective . . . to control a single machine, a conveyor line or an entire installation. Through *Progressive Automation*, you next add other Westinghouse coordinating controls and systems—all of which are compatible with those already in place. Your eventual target may be all production facilities fully coordinated with the Westinghouse industrial control computer.

**PROGRESSIVE AUTOMATION ALREADY AT WORK**—*In the paper industry*, PULSETTER* makes possible new standards of accuracy and product quality in paper production. The PULSETTER control system uses digital circuitry to maintain accurate synchronization of the speed *and* position of all sections of a paper machine. Accuracies can be maintained to only a 5″ variation in 2000 feet of paper.

*In the chemical processing industries*, Westinghouse provides OPCON* which experiments, then finds and controls optimum production efficiency.

*For the primary metals industry*, installations of Westinghouse PRODAC* (programmed digital automatic control) have improved product quality and mill functions, as well as monitoring all phases of the product and process by data accumulation systems.

For the first time, there is now one source for all your automation needs: Westinghouse computers, controls, drive systems, transformers, motors, gearing, switchgear . . . and Westinghouse assumes full electrical system responsibility.

Call on Westinghouse and detail your objectives. We are prepared to work out your automation plan . . . furnish, install and maintain the necessary electrical equipment. Your Westinghouse representative has complete details on *Progressive Automation*.

*Trade-Marks
J-96144

PRODAC control computers are designed to work in unison with conventional control equipment. Result: full automation of plant or process becomes a practical reality.

YOU CAN BE SURE...IF IT'S Westinghouse

COSMETICS LABORATORY

FOOD LABORATORY

PLASTICS LABORATORY

DETERGENT LABORATORY

FACTORY

# FLEXIBLE CONTROL OF AIR CONDITIONING

## Required for Atlas Powder Company Technical Center

Atlas Powder Company's Technical Center in Wilmington, Delaware, demands exceptional variety and precision in the control of temperature and humidity. Especially sensitive spots include the constant temperature and humidity rooms and variable temperature and humidity rooms, where tests can be conducted under rigidly controlled conditions.

Throughout the center, elaborate facilities are provided both for product testing and development and for basic research. Laboratories are devoted to research and testing of foods, pharmaceuticals, paints, textiles, and cosmetics, as well as industrial chemicals.

To meet the diversified needs of this modern R & D facility, the building is equipped with a specially engineered Johnson Air Conditioning Control System. Individual room controls assure the exact climate required for each of many purposes.

As in so many industries today, efficiently controlled air conditioning plays an important role in sustaining high working efficiency, in attracting competent personnel, and in reducing absenteeism and costly turnover — in addition to meeting the special thermal requirements of products and manufacturing processes.

Whether your problems concern comfort control or the regulation of process air conditioning, the specialized Johnson organization can install a control system designed to meet your exact requirements. When you build or air condition, ask your consulting engineer, architect, or local Johnson representative to explain the unmatched performance features and operational savings a Johnson System offers.

Johnson Service Company, Milwaukee 1, Wisconsin. 105 Direct Branch Offices.

CHEMICAL RESEARCH LABORATORY

Technical Center, Atlas Powder Company, Wilmington, Delaware. Designed and built by H. K. Ferguson Co., New York.

JOHNSON CONTROL

PNEUMATIC SYSTEMS

DESIGN • MANUFACTURE • INSTALLATION • SINCE 1885

# Put materials handling on a PRODUCTION LINE BASIS with a UNIT-COLES mobile crane

This 12-ton Model S-1210 mobile crane is moving tractor parts from trailer to storage area at the International Harvester Plant, Chicago.



**WORLD'S SAFEST CRANE**

One of many UNIT-COLES safety devices is this safe load indicator which automatically warns operator of dangerous load condition, then instantaneously "stops and holds" boom and load-hoist motions.

Mounted on a self-propelled carrier, a UNIT-COLES mobile crane travels quickly, indoors or outdoors, from one end of the plant to the other . . . handles materials flow from start to finish with production line efficiency. A cantilever-type boom gives *this crane* lower-than-usual overall height, making it ideal for in-plant operation and for unloading or loading motor or rail carriers. Tail swing and turning radius are shortest of any full-circle revolving crane, providing easy maneuverability in congested areas. Instinctive "left-for-left" and "right-for-right" steering, regardless of direction cab is facing in relation to chassis, *plus* independent swing and travel, simplifies travel along narrow aisles.

Load-hoist, swing, and boom-hoist are independently powered by separate electric motors with an infinite range of speeds. At the touch of a lever the operator raises or lowers a load quickly, or inches it so slowly that it barely appears to move. And, with boom-hoist independent, he can boom up or down during swing without pausing.

Operating a UNIT-COLES is really simple — no gears to shift, no clutches to move. Inexperienced men have become competent operators within a few hours. The man in the cab feels safe and secure, too, knowing that his UNIT-COLES is fitted with exclusive safety devices like the automatic safe load indicator, self-resetting limit switches on load-hoist and boom-hoist, and fail-safe automatic braking, with "dead man control", on all crane motions.

UNIT-COLES mobile cranes are available in capacities from 5 to 50 tons and with a wide range of versatile lifting attachments. For details and the name of your nearest dealer, write today.

UNIT

UNIT CRANE & SHOVEL CORP.

6703 W. Burnham Street

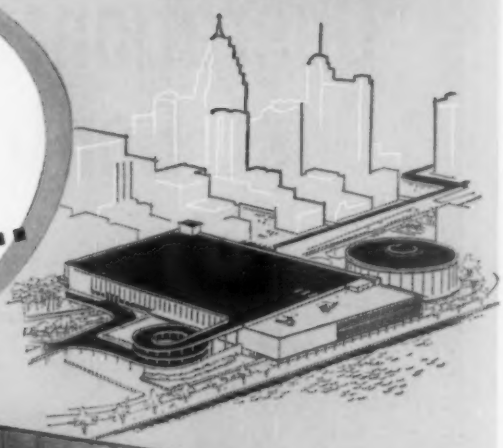
Milwaukee 19, Wisconsin

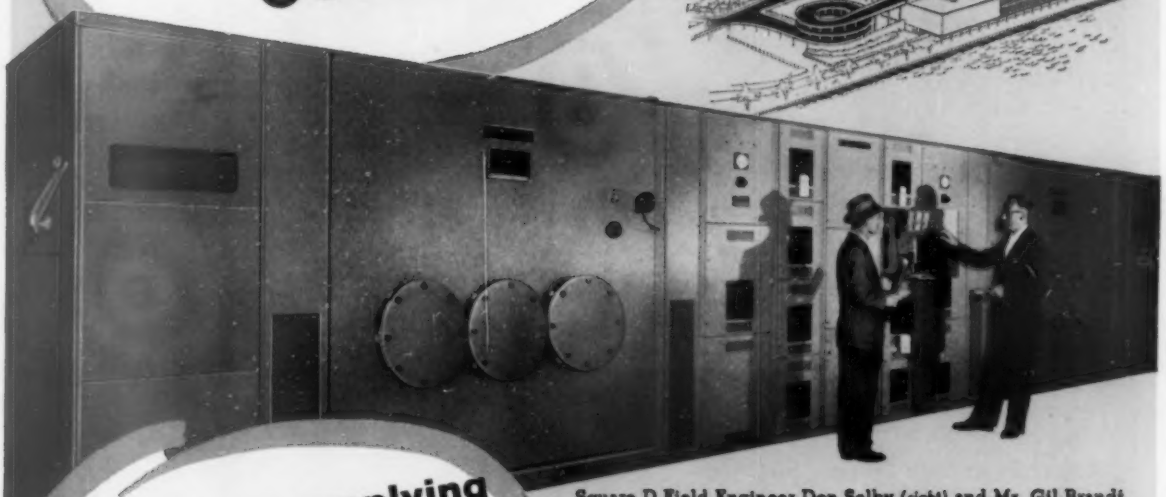


For more facts Circle 426 on Reader Service Card

# 11 SQUARE D SUBSTATIONS SERVE COBO HALL...

World's largest exhibition building, COBO HALL occupies 10 acres of Detroit's Civic Center





...capable of supplying 22,000 KVA of continuous power!

Square D Field Engineer Don Selby *(right)* and Mr. Gil Brandt, Project Electrical Engineer of Giffels and Rossetti, architect for COBO HALL, examining one of the drawout circuit breakers in the low voltage secondary portion of a Square D 2000 KVA double-ended unit substation equipped with nitrogen-filled transformers

Easy, fast installation was a prime objective when eleven Square D unit substations went into COBO HALL. The various sections of each substation were completely coordinated at the factory. Reconnection of those sections at the job site required a minimum of time and labor.

Design leadership is very much in evidence in Square D's broad line of unit substations. We suggest a three-point comparison to prove the point—ease of installation, minimum maintenance, maximum safety for both equipment and personnel.

**AMONG OTHER SQUARE D EQUIPMENT IN COBO HALL**

31 Control Centers
28 Switchboards
450 Panelboards
75 Contactor Panels
1 Dimmer Board
10 Dimmer Panels
16 NEMA 4-Circuit Interrupters
120 Spotlight Control Panels
19,000 feet of Lay-In Duct

SQUARE D COMPANY

*wherever electricity is distributed and controlled*



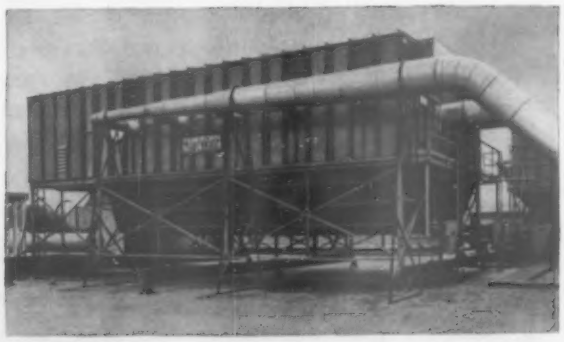
For more facts Circle 427 on Reader Service Card

# Operation: Dust Control

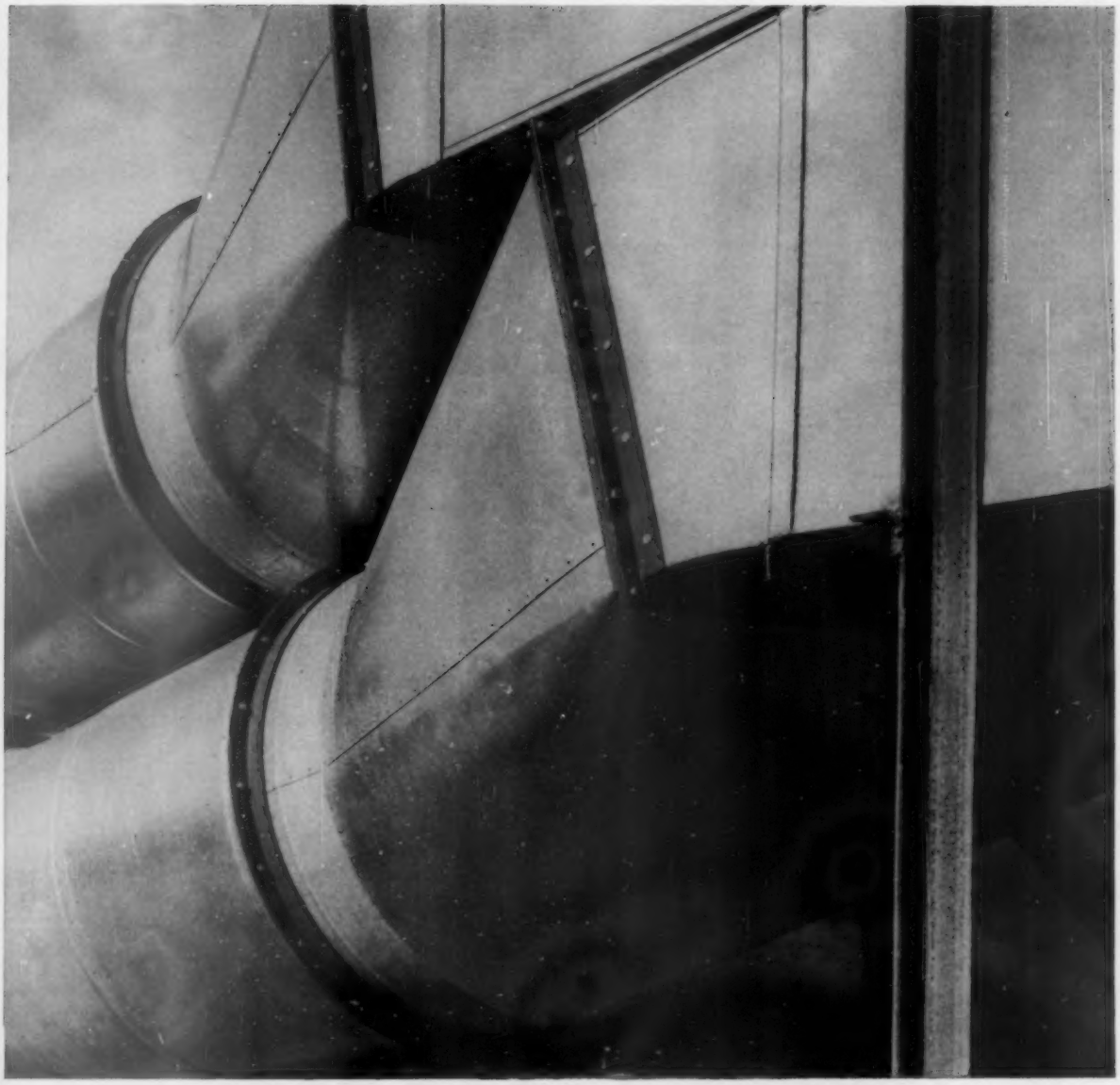
(One of a series)

# At National Cash Register, 10 tons of wood

Dust is trapped at the source by hoods engineered for the individual job . . .



. . . and is piped from 160 locations to five giant Pangborn Cloth Bag Collectors.



# shavings, chips and dust are collected daily!

*Mammoth* is the word for the 5-floor woodworking plant of National Cash Register headquarters, Dayton, Ohio. Processing nearly 300,000 sq. ft. of lumber each month, this operation generates 10 tons of waste material per day.

To protect NCR employees, equipment, plant and neighborhood, five Pangborn Cloth Bag Dust Collectors trap 90 cu. ft. of fine dust for disposal and, during the winter months, permit recirculating of the already-heated, cleaned air. This efficient performance of Pangborn Dust Control saves thousands of dollars in heating costs during the cold weather. In addition, a neighborhood and health nuisance has been eliminated; equipment maintenance and plant housekeeping costs have been minimized.

Dust a continuing problem in *your* plant? Talk to the Pangborn man in your area or write: PANGBORN CORPORATION, 2100 Pangborn Blvd., Hagerstown, Md. *Manufacturers of Dust Control, Blast Cleaning, Vibratory Equipment—Rotoblast® Steel Shot and Grit.®*

**Pangborn**
OF HAGERSTOWN

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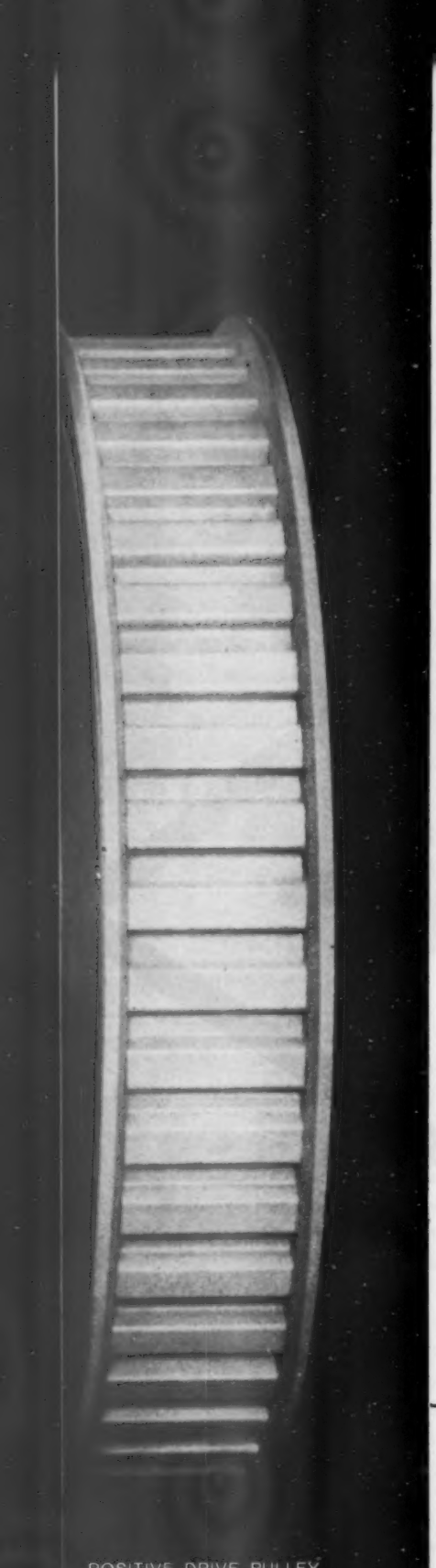
For more facts Circle 429 on Reader Service Card ➤

THE NEW MULTI-WEDGE DRIVE SHEAVE

MULTI-V DRIVE SHEAVE



POSITIVE DRIVE PULLEY

# SEE ALL THREE BEFORE YOU BUY

Horsepowerwise—the three wheels shown are the same. But Multi-V (long the industry favorite) is bulky, as compared with the new lighter, equally strong Multi-Wedge Sheave. And the Positive Drive combines advantages of the chain and gear with the advantages of the belt.

Worthington supplies all three drive types with the tapered, split QD hub with the Golden Screws. And each drive is supplied with the unsurpassed Worthington-Goodyear belts, too. Total result is compact, long-lived economical drives.

Which drive you choose is up to you. To help you decide, Worthington has just issued new engineering manuals on all three, including "how-to-figure-it" information as well as product data. Ask the Worthington distributor listed in the Yellow Pages for the manual(s) you want. Or send the coupon below.

Worthington QD hub with the Golden Screws. The clamp screw simplifies installation and assures permanent alignment. The set screw prevents key drift. Sheaves with QD hubs are always easy on . . . easy off . . . always tight.

WORTHINGTON

**WORTHINGTON CORPORATION**
**Section 79-30, Oil City, Pa.**

Please send me the engineering manuals checked here.

☐ Multi-Wedge ☐ Multi-V ☐ Positive Drive

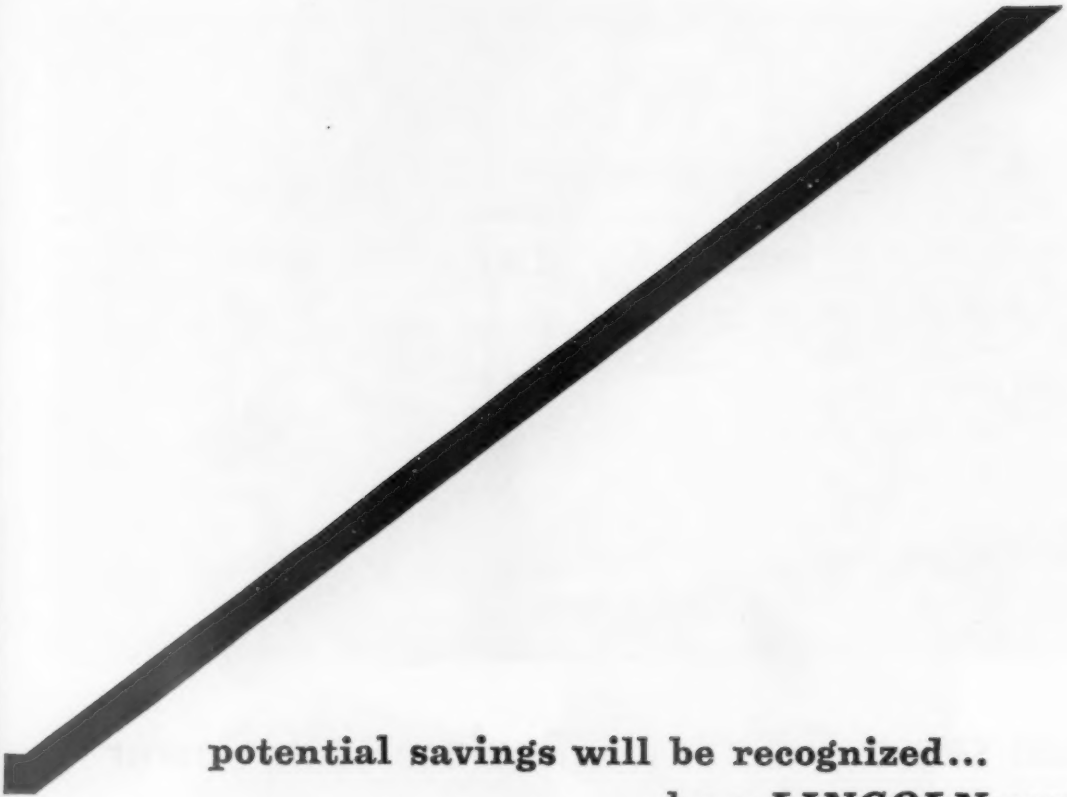
NAME_____

COMPANY_____

STREET_____

CITY_____ STATE_____

**An Iguana will be recognized...**
**by a *HERPETOLOGIST***
*(specialist in reptiles)*



## potential savings will be recognized... by a *LINCOLN* man

*(specialist in arc welding)*

ANY IDEA which can cut welding time from 90 to 45 minutes on missile beams for the Army is darned important! That's exactly what happened in a New Jersey plant.

A LINCOLN Field Engineer was walking through the plant with the Welding Foreman and Plant Manager. Naturally he was interested in watching the welding operation on missile beams. A thought crossed his mind. He asked if he could demonstrate LINCOLN Jetweld electrodes on the beams. He rolled up his sleeves; took some Jetweld from the trunk of his car, and cut the welding time from 90 to 45 minutes. The weldors on the job did the same.

That afternoon the Field Engineer finished his plant tour and spotted some applications for Fleetweld 37 electrodes for welding sheet metal on trailer bodies. Again welding time was cut almost in half, cleaning time reduced and overall costs slashed to the bone.

Quite a day's work for one Field Engineer . . . but putting PROFIT into welding operations is part of each LINCOLN man's job. You can count on him to show you . . . not tell you how to cut costs and make more money.

That's why we say it's a good idea to do business with LINCOLN where arc welding is a specialty and cost reduction comes to you as a "plus" at no charge.

Call your LINCOLN Field Engineer today.

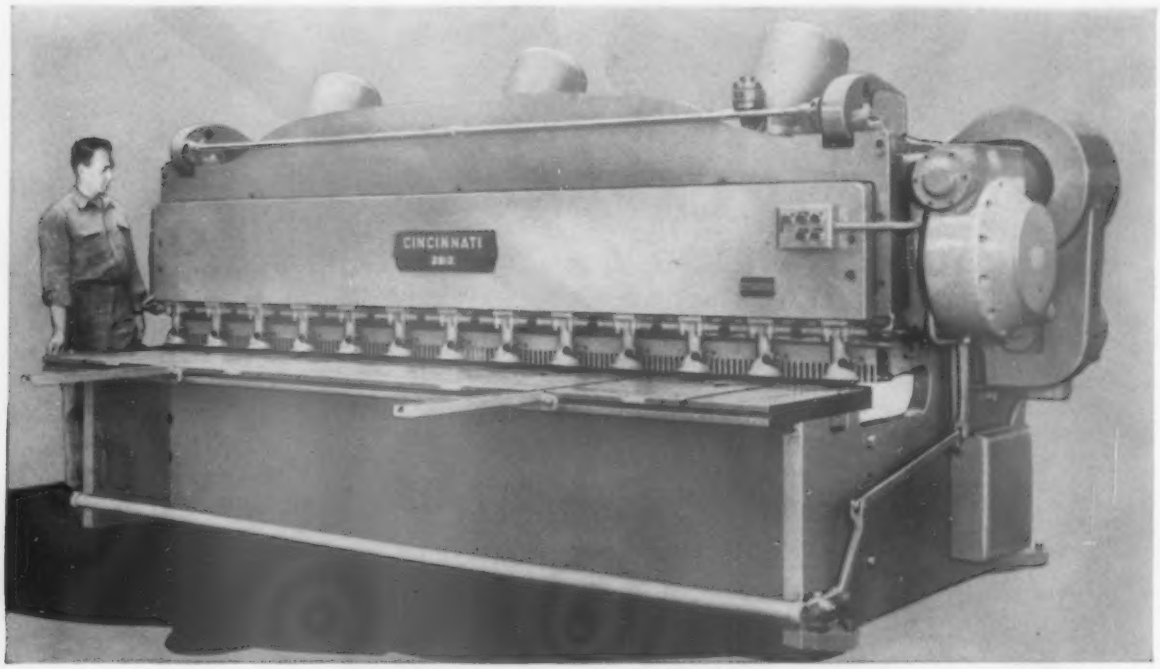
THE LINCOLN ELECTRIC COMPANY
Dept. 1830 • Cleveland 17, Ohio

LINCOLN WELDERS



For more facts Circle 430 on Reader Service Card

Better products, *faster*, from your Bearing Specialist:




# Common sense dictates . . . "Replace with Bower"— readily available from your Bearing Specialist!

**Both manufacturers of heavy-duty metal-working machines and maintenance men agree . . . Bower roller bearings keep production up to peak levels**

Bower roller bearings take on heavy assignments with ease where load stresses are high and an exacting degree of accuracy is required. To maintain an absolute minimum of running friction, tolerances for certain bearing parts are held uniformly to within millionths of an inch, measured only with super-precision electronic gauging equipment.

You will find these better built Bower tapered and straight roller bearings working round the clock in practically every type of modern machinery. So, it's just common sense to call your Bearing Specialist when you need replacements of any kind. He'll see you get *fast* delivery.

## BOWER ROLLER BEARINGS

BEARING BOWER ROLLER BEARINGS SERVICE

FEDERAL-MOGUL SERVICE

DIVISION OF FEDERAL-MOGUL-BOWER BEARINGS, INC. • DETROIT 13, MICHIGAN



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For more facts Circle 432 on Reader Service Card ➤

*A complete line of integral HP motors: dripproof protected—totally enclosed—and explosion proof*

# ELLIOTT C-W MOTORS

## *conservatively designed, ruggedly built, highest quality throughout*

The extra service users enjoy from Elliott C-W motors is due to the conservative design, precision manufacture and high-quality materials of these machines. For most applications, the dripproof-protected type gives dependable service. Where conditions are more severe the totally-enclosed or explosion-proof construction may be required. Recently added to the line are the EPA-SEAL epoxy insulated C-W motors for service where moisture or corrosive atmospheres demand superior insulation.

Vacuum-pressure process thoroughly impregnates coils with epoxy resin.

**ELLIOTT Company**
*Crocker-Wheeler Plant*
*Jeannette, Penna.*

WO-2

Another Ⓜ Test System at work...

*A Magnaflux Type "N" Test Unit used for checking the quality of all chemical and medical tablet press punches at the Arthur Colton Company.*

## 8 Out of 10 Plants Need Only this One Unit to Handle All Magnetic Particle Testing

After an industry survey, Magnaflux has engineered a single test unit versatile enough to handle *all* magnetic particle test requirements in 8 out of every 10 plants. The new Type "N" Test Unit (A.C. or D.C.) locates cracks in parts up to 24 inches long, 10 inches in diameter. It is equally efficient whether you test many different parts or a few standard parts at high volume and speed.

Infinitely variable current output assures optimum control for each test need.

Standard adapters and jigs, automatic magnetization and processing, even conveyorized handling, at small extra cost.

Optional coil provides simultaneous circular and longitudinal magnetization—doing the work of two units.

Grouped controls speed operation—standing or sitting.

Phone our local Field Engineer or write Magnaflux Corporation, 7316 West Lawrence Avenue, Chicago 31, Illinois.

Ⓜ MAGNAFLUX CORPORATION
A SUBSIDIARY OF GENERAL MILLS
General Mills
TEST SYSTEMS

Ⓜ Test Systems include MAGNETIC PARTICLE, FLUORESCENT PENETRANT, THERMOGRAPHIC, EDDY CURRENT, ULTRASONIC, STRESS ANALYSIS, GAMMA RAY SERVICE, DYE PENETRANT & MAGNETIC FIELD


For more facts Circle 433 on Reader Service Card

FACTORY PRESS TIME REPORT • SEPTEMBER 1960

# Looking ahead in business

**Business prospects remain sound as we head into the final months of 1960.** The gross national product (GNP) hit a record $505-billion during the second quarter—$4-billion ahead of first quarter figures.

It's likely to grow a bit more rapidly in the final quarter than it has during the summer months.

**GNP at year's end will probably run above the $510-billion mark on an annual rate basis.** And the net gain in business for the year will come to about $30-billion—good, but a good deal less than that registered for 1959.

•

**But businessmen aren't unanimously cheering the most recent economic developments.** Manufacturers haven't chalked up the kind of gains they had expected for this year. And reasons for their disappointment are clearly evident in the course of industrial production in recent months.

**Industrial output is still below the peak hit in January, as indicated by the Federal Reserve Board.** And at 165 (1947-49 = 100) for July, the Index was just two points above the level for July 1959.

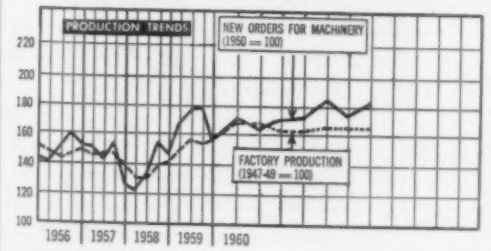
**The McGraw-Hill index of new orders for machinery showed a slight increase in orders to machinery producers during July.** But more substantial increases must come before industrial output heads significantly upward in this important sector.

**Despite recent gains in personal income, a substantial pick-up in consumer spending is not expected in the near future.** But modest increases are sure to come. Reason: Personal income for July hit a record annual rate at $407-billion. True, the gain registered for the month—$1-billion—was much smaller than that in earlier months this year. Again, however, it's enough to boost consumer buying.

•

**Meanwhile, business spending continues to be an important prop to the economy.** Businessmen continue to make substantial outlays for new plants, equipment, and inventories. Current indications are that total capital spending for 1960 will be well ahead of last year. Together, these expenditures are a key reason for high levels of business activity.

**FACTORY FIGURES OF THE MONTH**




| Indicator | JULY[P] 1960 | JUNE[r] 1960 | JULY 1959 |
|---|---|---|---|
| New Orders for Machinery (exc. elec.)[1] | 181.0 | 176.0 | 182.0 |
| Contracts for Industrial Construction[2] | 151.0 | 154.0 | 89.0 |
| Factory Production[3] | 165.0 | 165.0 | 163.0 |
| Consumers' Prices (cost of living)[4] | 126.6 | 126.5 | 124.5 |
| Industrial Prices (materials, supplies)[4] | 128.2 | 128.2 | 128.2 |
| Manufacturing Employment (millions)[4] | 16.3 | 16.5 | 16.5 |
| Total Employment (millions)[5] | 68.7 | 68.6 | 67.3 |
| Unemployment (millions)[5] | 4.0 | 4.4 | 4.0 |

[P] = preliminary [r] = revised

Sources: 1. McGraw-Hill Department of Economics (1950 = 100); 2. Engineering News-Record (1950 = 100); 3. U. S. Federal Reserve Board (1947-49 = 100); 4. U. S. Department of Labor, Bureau of Labor Statistics (1947-49 = 100); 5. U. S. Department of Labor, Bureau of Labor Statistics.

**Conversely, home-building activity hasn't picked up as expected.** Despite moves by the Federal Reserve to make mortgage money more plentiful, residential construction hasn't headed upward. But there is a real demand for new homes, and this should reveal itself in the months ahead.

**One factor is certain. Any real surge in business in the months ahead is likely to come from stepped-up government spending.** Higher pay to government employees is already increasing federal spending. Increases in other areas are sure to come when a new administration takes over.

**Both parties are clearly committed to bigger defense spending.** In addition, both are pledged to stronger action on programs such as urban renewal, aid to education, and aid to areas of high unemployment.

All these proposals indicate that government spending will be adding significantly to the gross national product as we move into 1961.

# Leads to read and save

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## 1.0–1.4 Plant Maintenance and Engineering

MANAGEMENT AND PRACTICES (1.1)

**1.1 A plant engineer in action (Sept. '60) p. 80 (1.11)**
**1.1 Foreign maintenance (Sept. '60) p. 119 (1.11)**
1.104 Making moving painless (Sept. '60) p. 185 (2.103)
1.11 Sealing with epoxy (Sept. '60) p. 183 (1.303)
1.11 Drive ousts stems (Sept. '60) p. 185 (1.113)
1.11 Expansion joint beats 25-ton force (Sept. '60) p. 188
1.11 Bolted furnace slashes downtime (Sept. '60) p. 190
1.113 Bridge on wheels in 10 minutes (Sept. '60) p. 183
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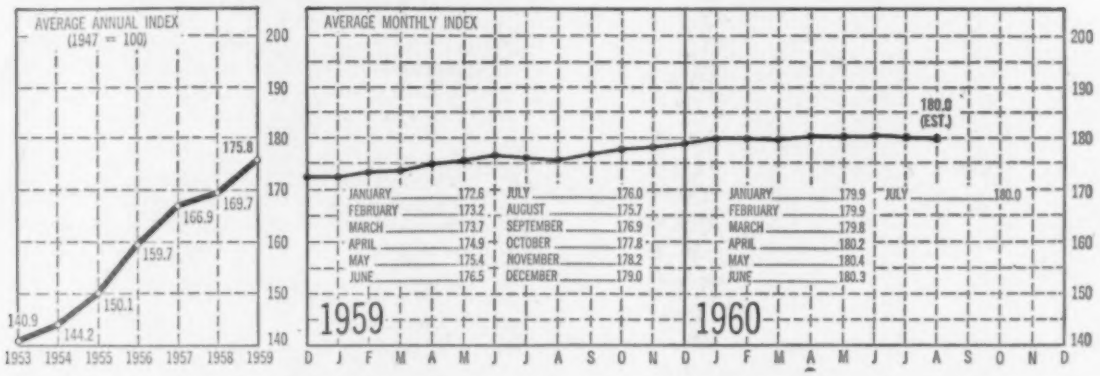
FACTORY PRESS TIME REPORT • SEPTEMBER 1960

# Cost index of plant maintenance




## Index moves down again

**Though pattern isn't expected to continue, outlook is still bright for year's end.**

For the second month in a row, FACTORY's Cost Index of Plant Maintenance has retreated—this time by 0.3 of a point. There's no question that labor costs, which held steady during this period for the first time since February, made the drop possible.

Over-all materials costs in both major categories of the Cost Index were off by the same amount—one point—between June and July.

Materials costs in the equipment index were dragged down by a large 9.1-point dip in the price of bearings. However, other materials prices in the equipment index showed only small changes. Cutting tools, for instance, were down 0.3 of a point, valves and fittings were down 1.4 points, while pumps rose a half point.

In the building and facilities index, where the price index for glass dropped 5.9 points, most other materials price changes were also quite small. Heating equipment prices dipped 1.4 points in the same area, while the cost for solder was up for the fourth consecutive month, this time by 1.8 points.

Don't be over-confident about the fact that the Cost Index has fallen two months in a row. There's little prospect of the decline continuing during the months ahead. But there is this optimistic note: By the end of this year, the Cost Index will probably be only one point higher than it was in January, contrasted with the 6.4-point increase registered last year. In the first seven months of 1960, the Index inched up by only 0.1 of a point, compared to a rise of 3.4 in the same period in 1959.

| | AVERAGE 1959 | JULY (Preliminary) | JUNE (Revised) |
|---|---|---|---|
| **Building and Facilities Index** | 166.5 | 170.8 | 171.2 |
| **Materials** | 142.3 | 139.8 | 140.8 |
| Brick | 152.5 | 155.1 | 155.0 |
| Elec. fixtures | 129.0 | 132.4 | 132.4 |
| Elec. switches, boards, fuses | 185.6 | 184.1 | 184.1 |
| Elec. wire, copper | 138.9 | 148.7 | 148.2 |
| Glass | 152.0 | 142.0 | 147.9 |
| Gutters, spouts, ducts | 178.0 | 180.2 | 180.2 |
| Gypsum products | 140.8 | 140.9 | 140.9 |
| Heating equipment | 127.7 | 124.8 | 126.2 |
| Lumber | 134.5 | 128.7 | 132.2 |
| Millwork | 155.7 | 157.0 | 156.9 |
| Paint | 130.1 | 130.2 | 130.1 |
| Pipe, cast iron | 170.4 | 170.4 | 170.4 |
| Pipe, steel | 190.9 | 188.7 | 192.6 |
| Pipe & tubing, copper | 154.1 | 156.2 | 156.2 |
| Roofing | 123.7 | 113.2 | 113.2 |
| Sanitary fixtures | 155.6 | 161.8 | 161.8 |
| Sash, metal frame trim | 140.9 | 136.5 | 136.5 |
| Solder | 124.1 | 124.1 | 122.3 |
| Steel, structural | 236.3 | 236.3 | 236.3 |
| Tanks, steel | 138.0 | 139.1 | 139.4 |
| Valves & fittings | 166.7 | 165.7 | 167.1 |
| Wire mesh | 162.6 | 162.9 | 162.9 |
| **Labor** | 182.6 | 191.4 | 191.4 |
| Carpenters | 168.9 | 178.6 | 178.6 |
| Electricians | 191.1 | 199.6 | 199.6 |
| Painters | 187.9 | 196.0 | 196.0 |
| **Equipment Index** | 179.5 | 183.9 | 184.2 |
| **Materials** | 176.1 | 176.8 | 177.8 |
| Abrasives | 161.0 | 157.9 | 157.9 |
| Alloys, non-ferrous | 125.4 | 123.5 | 122.6 |
| Bars & plate, steel | 227.1 | 227.2 | 227.2 |
| Bearings | 164.1 | 155.4 | 164.5 |
| Belting | 157.3 | 159.3 | 159.3 |
| Bolts, nuts & screws | 225.6 | 223.8 | 223.8 |
| Chain | 184.0 | 184.0 | 184.0 |
| Controls (electrical) | 185.6 | 184.1 | 184.1 |
| Gear-reduction units | 181.7 | 181.7 | 181.7 |
| Hand tools, mechanics | 198.2 | 203.8 | 203.6 |
| Lubricants | 124.1 | 125.7 | 125.7 |
| Motors | 147.3 | 143.6 | 143.6 |
| Non-ferrous metals | 129.0 | 136.6 | 136.6 |
| Precision tools | 156.6 | 158.2 | 158.2 |
| Pumps | 194.8 | 196.6 | 196.1 |
| Tools, cutting | 172.4 | 188.6 | 188.9 |
| Valves & fittings | 166.7 | 165.7 | 167.1 |
| **Labor** | 181.8 | 188.6 | 188.6 |
| All mfg. labor | 179.9 | 184.4 | 184.4 |
| Machine tool labor | 184.2 | 192.7 | 192.7 |
| **FACTORY'S COST INDEX** | 175.8 | 180.0 | 180.3 |

FACTORY PRESS TIME REPORT • SEPTEMBER 1960

# Looking ahead in labor

**Look for a hard push in the next Congress to toughen up the two-year-old Federal Welfare and Pension Plan law.** So far, this law that requires reporting and disclosure of all plans covering at least 25 employees is a bust. Secretary of Labor James Mitchell terms the law a "shameful illusion" that wastes the taxpayers' money and does nothing to curb embezzlement or manipulation of such funds—which is what it was designed to do.

•

**Reason for this tough talk: An 18-month survey on the workings of the law by the Labor Department. Here's what the survey discloses:**

• **Total welfare and pension plan reports filed to date are at least 50,000 short of the number that should have been reported.**

• **At least 17,000 reports were discovered to be deficient.** Only one-fourth have been corrected at the Labor Department's request.

• **The Department cannot legally guide plan administrators in filling out fund reports** since it is limited to advisory opinions. This is a major cause of misfiling.

• **Enforcement is limited to employee court suits to compel compliance.** The Labor Department is solely a collection agency without authority to act against fraudulent returns.

•

The Welfare and Pension Plan law was the first labor anti-racketeering bill to go through Congress after Senate and House committee hearings uncovered extensive abuses in handling the multi-million-dollar funds. These abuses included such practices as embezzlement, kickbacks, excessive commissions, conflicts of interest, and so on.

Mitchell, in his charge against the law, notes that no abuses have been uncovered in the past 18 months. **"It would seem illogical to assume," he says, "that these abuses in their entirety have ceased simply because administrators of covered welfare and pension plans must publish plan descriptions and a limited amount of financial information."**

**The changes that will be sought in Congress next January—and these will be offered by both Democrats and Republicans—are:**

• **Providing enforcement powers for the Secretary of Labor,** including subpoena power and the use of injunctions in investigations.

• **New criminal provisions** that would make embezzlement and kickbacks a federal felony.

•

**The National Labor Relations Board is sweating out the Taft-Hartley Act's new picketing regulations.** These rules, part of the 1959 Landrum-Griffin reform law, have put a crimp in the use of the picket line to organize or to seek recognition from an employer. Such picketing is banned where it seeks to force an employer or his employees to accept the union as a bargaining agent. All organizational picketing is limited to a maximum 30-day period unless an election petition has been filed. However, publicity picketing to advise the consumer that employees are non-union is permitted, provided it does not affect an employer's normal business operations.

**So far, these amendments have caused only confusion for the Board.** In four key cases, its trial examiners —who investigate and make the first interpretations —have split two-to-two in their decisions. The five-man agency, which must make the final rulings, has decided to take up the four cases in a single package. Prior to settlement, an oral hearing is being held this month at NLRB headquarters.

**As an example of the confusion, Trial Examiner Ralph Winkler (Charlton Press Case) holds that a majority union is not restricted in recognition picketing where an employer has engaged in an unfair labor practice to defeat the union.** In a second similar case (Blinne Construction Company), Trial Examiner John F. Funke finds that a union violated the law by picketing for recognition despite an employer's illegal act in refusing to bargain with the union. Says Funke, making the task no easier for the board members: "The act . . . confers self-organizational rights upon employees in one section and grants a charter of immunity against violation of those rights by employers in another . . ."

SEE LABOR RELATIONS NEWS, PAGE 194

# Industry Spoken Here

North Carolina's 18-man Commerce and Industry team of location engineers, headed by Wm. R. Henderson ( Center ), has a specialist for just about any "language" industry may speak —or any question you may ask. This team includes chemical, civil and mechanical engineers, research analysts, small-industry specialists, and other experts qualified to provide basic information on plant sites.

Give this team your challenge. It will be met in complete confidence, entirely without obligation, with a promptness that may surprise you.

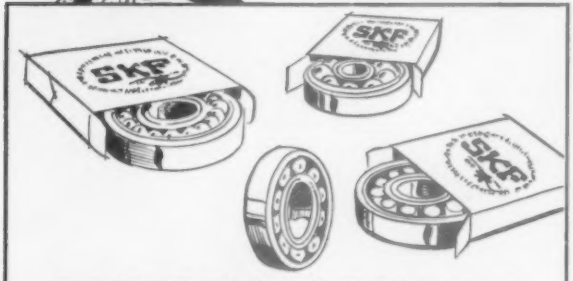
For information about plant locations in North Carolina you can communicate in confidence with Governor Luther H. Hodges, Chairman of The Board of Conservation and Development, Raleigh, North Carolina.

# NORTH CAROLINA

## DISTRIBUTOR DAN, the SKF bearing man, shows

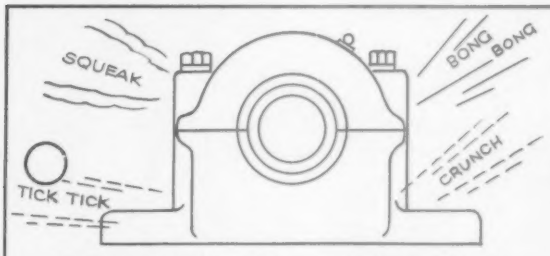
# HOW TO CHECK BEARINGS DURING RUN-IN

## —to prevent damage and downtime later!



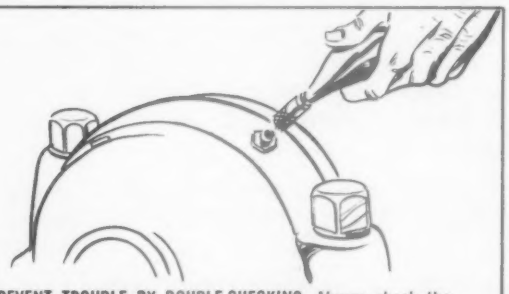

**THINK BEFORE YOU INSTALL THEM.** The first few hours of operation are the most critical in a bearing's life. So, operate the bearing at reduced speed and load during run-in. Bearing run-in periods vary from a few hours to a few weeks, but 24 hours is usually sufficient.

**NOISE CAN BE A SYMPTOM.** A soft, purring sound is all you should hear from a bearing—if it's operating correctly. Check by placing the blade of a screwdriver and listening at the handle. Any other noise means trouble sooner or later.




**KNOW YOUR NOISES.** Squeaking means inadequate lubrication. Metallic tones indicate shaft or housing interference or improper adjustment. Smooth, clear tones tell of marks in the stationary raceway. Intermittent noises indicate a damaged ball. Crunching means dirt.

**TOO HOT TO HANDLE?** There's trouble brewing if the housing feels excessively hot. High temperature usually indicates overlubrication or use of a lubricant with too high viscosity. It can also be a sign of excessive axial or radial preloading, misalignment, tight-fitting seals, or rubbing.



**PREVENT TROUBLE BY DOUBLE-CHECKING.** Always check the bearing after the critical run-in period. Examine the lubricant. If it's dirty, change it. Check the seals for signs of wear or damage. A few minutes spent double-checking now eliminates chances of costly damage and downtime later.

**Baffled by a bearing problem? Whether it's selection, mounting or maintenance—consult your Authorized SKF Distributor. He's staffed to help you keep them running smoothly and he stocks all the bearing types and sizes you need.**

SKF

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FACTORY

# Red ink and prosperity

This year the United States will produce more goods and services than ever before in her history. Economists predict the Gross National Product will inch up to an all-time high of $508-billion by the year's end. To the economist, this spells prosperity. But to many a manufacturing plant, all it adds up to is red ink.

Here's the disturbing paradox. While business, generally speaking, has been good, manufacturing plants are today undergoing a painful profit squeeze. One study of 500 major corporations shows a 1960 decrease in profits of 8% over last year. A simplified explanation is that while the American consumer is spending more than ever before, he's also demanding—and getting—more for his money than ever before.

The red ink on the ledger has a straightforward message for you. It warns that the buyers' market will continue to pinch plant management people in the areas of cost, quality, and delivery.

Unbelievably tough competition, domestic as well as foreign, is deflating the comfortable cushion of ever-increasing prices. Today the fat *has* to come out of your manufacturing costs.

Awakened consumer expectations of trouble-free goods rule out the specious solution of substituting planned obsolescence for quality. Today the customer insists on something that works now and will keep on working; otherwise, he'll buy elsewhere.

Customer inventory levels have purposely been drained low and will tend to remain that way. Plant operations—not a well-stocked warehouse—will be expected to bear the cost of delivery of what the customer wants *when* he wants it.

In the face of these pressures, which direction should you take? Let's look at the record. Some manufacturing companies are giving the customer more for his money today and are still able to mark up their income in heavy black ink. Westinghouse Electric, Scott Paper, American Machine & Foundry, to name a few, show big profit improvements over 1959. Are they just lucky? A little. Happily, they aren't in steel or autos. But the truism is that in 1960, as in every other competitive year, the race belongs to the swift. For the profit-makers, smart alert management all along the line—including the management of plant operations—spells the difference between red ink and black ink.

The management of plant operations is a difficult task at best. Cold wars and general prosperity apparently don't make it any easier. Economic progress allows little time for relaxation. In fact, to borrow a political phrase, fence mending (perhaps fence building is a better choice) is a perpetual chore for plant management people. If it isn't your way of doing business now, it ought to be.

L. R. Bittel

EDITOR-IN-CHIEF

**"A plant engineer can't do an effective job unless he gets constant, active management support. Without it, our program would surely have failed."**

**William Duffy, Chief (Plant) Engineer**

On the plant floor, three key managers—Duffy (center), General Manager W. C. Leingang (left), Asst. General Manager Robert Kent—discuss improvement plans.

These men blended management and engineering skills to...

# RENOVATE AN ANCIENT PLANT

**Four years ago, plant problems had piled up for Stokes Molded Products (Trenton, N.J.), a division of The Electric Storage Battery Company.**

- **Inefficient, high-cost maintenance was hurting the profit picture.**
- **Downtime on production equipment ranged from 2% up to 40%.**
- **Building deterioration contributed to an outrageous winter heat bill.**

Today this plant is a better, cleaner, brighter work place, with a modernization and upkeep program that will hold its own. Monthly maintenance costs have dropped more than 30%. Machine downtime averages below 2%. Scrap is at an all-time low.

How do you restore a run-down plant? FACTORY editors asked this question of Bill Duffy, Stokes chief plant engineer. He replied: "You have to resign yourself to many hours of hard work—including some overtime—to do a proper planning job. The hour-by-hour, day-by-day problems in our old, run-down plant were so great that a real planning job could only be done in the evenings and on the weekends. Anyone embarking on such a program without expecting this kind of hard work may be bitterly disappointed." Duffy also feels that careful planning is needed—not piecemeal solutions. Says he, "It's got to be an integrated program of various facets. Leave out one facet and you limit the program's success."

"Above all," continues Duffy, "there's one prerequisite: management's backing. When I came to Stokes four years ago I was fully assured that management would back an improvement program." What does a plant engineer do, FACTORY asked, when he can't get this cooperation?" Duffy's quick answer, "If you can't get action after reporting the facts honestly and trying to sell improvements the right way—by figures on costs and savings—the program's doomed. If a man is afraid his program will cost him his job, he's dead to start with."

Stokes management was cooperative. Bill Duffy and his co-workers are still very much alive. Patience and continued presentation of facts and needs have won management's support through four years. During this time, three-fourths of the original five-year building-improvement program has been completed. Stokes realizes that total restoration—within a reasonable budget—will take at least five years. And it is currently considering a second five-year program to make sure it holds its gains and keeps abreast of new technology.

*Turn the page*

# Duffy tells of his integrated 4-point restoration program:

## 1. WE IMPROVED FACILITIES

We have 120,000 square feet in 30 buildings. It was all in bad shape, except for production equipment which *had* to be favored. To solve our problems, we applied the following program:

**Preventive maintenance**—Four years ago PM was getting only lip service. Plant equipment was on a breakdown-and-repair basis. Our PM inspector followed a loose schedule, but production foremen often held him off, and he seldom persisted.

We worked up a simple PM schedule for each department. Property asset cards, checked against physical conditions, were used as the basis. After gathering facts, we made up yearly schedules for each department. Each schedule shows the machine number, description, PM work needed, who does it and when. The maintenance clerk sends a weekly list of PM work to the craft leaders. At the end of the work week the leader returns it, showing progress. Uncompleted jobs are carried forward to the next week in blue pencil and, if prolonged for another week, in red pencil.

We call in the maker of all big or complex machinery for PM inspection, since he is the person who can best determine condition and need for overhaul or replacement. Also, our people can pick up pointers from him. It's as important not to let our men attempt to do work they are not qualified to do as it is to let them take over outside work they can do.

**One-shot improvements**—In a run-down plant there are scores of *obvious* problems hindering efficiency, such as altering a machine or installing a skylight. Once done, they're out of the way, so they're "one-shot" jobs. These jobs are set up on monthly schedules, and tied into the daily work load.

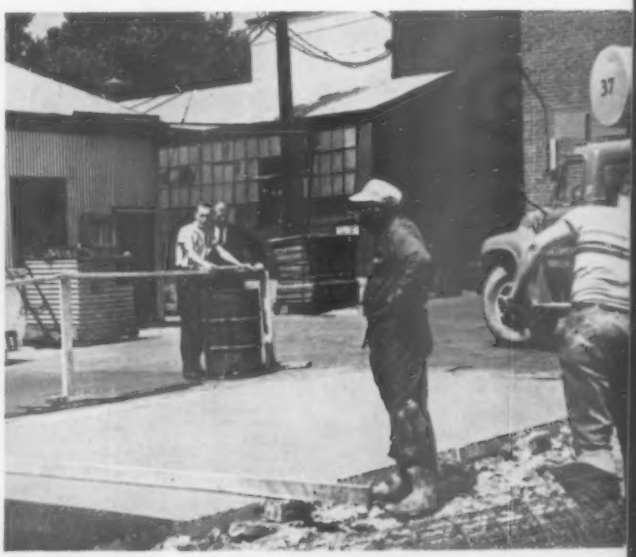
**Long-range improvements**—These included improvements necessary to restore buildings to safe and efficient operating condition and those not-so-obvious improvements that cut operating costs.

Restoration began with a complete survey of buildings and grounds. We drew up an itemized report of every cost. Separate cost figures were developed for Stokes labor and contract labor. Improvements were scheduled for completion in three to five years.

Cost reduction improvements required deeper study. Examples: Where might a power outage occur, and how could downtime be kept to a minimum? Could steam generation costs be cut by improving manpower costs, evaporation rates, and the like? Such questions were our research tools.

Our improvements are a direct result of keeping management informed—by written reports—of conditions, remedies, time and costs. These reports were detailed enough to let management cut parts without damaging the whole program. Without such communications any program will flop.

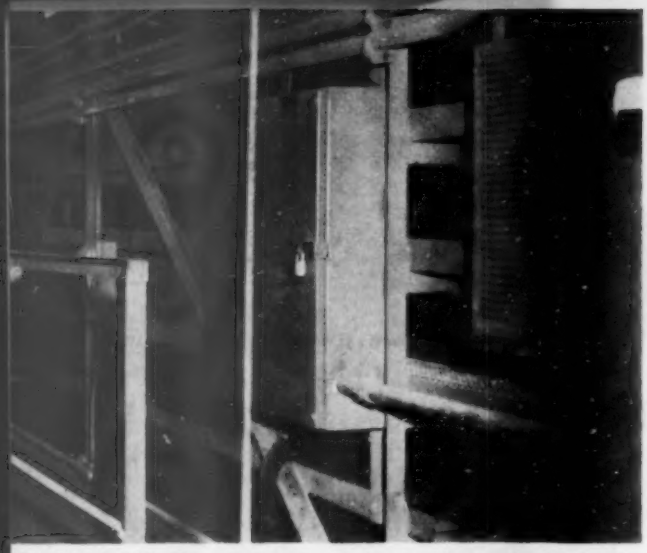
**NEW SASH.** Aluminum replaced old wood that was a potential hazard to window cleaners.



**NEW PAVEMENT.** Maintenance service on plant trucks was reduced by refacing plant's interconnecting driveways for a smoother ride.

**NEW BOILER** (oil) replaced coal units, has slashed maintenance costs.

**NEW WALL** widened inside floors and saves on heat bills.

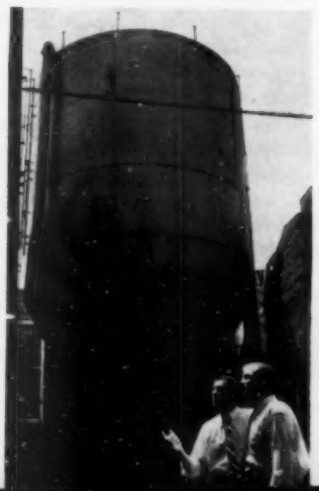


**NEW CONVEYOR.** Three-deck cooler for hard rubber stock eliminated three separate operations. Its installation cost was quickly paid off.

**NEW PAINT.** More light and higher morale reflect from this bright coating.

**NEW LUNCHROOM** is plant's first. Gave a big lift to morale.

**NEW SYSTEM** for handling battery filler material replaced 50-lb. bags.



## 2. WE UPGRADED MAINTENANCE

On starting this job we found we had no comprehensive roster of hourly rated workers. So we created one, showing the number of men in each skill. As chief plant engineer, my original supervisory staff included a plant engineer, master mechanic, assistant master mechanic, maintenance foreman, and nine craft leaders. Plant tours proved that a shake-up was clearly needed.

Of 84 craftsmen, only 60 were needed. So we set and met a reduction timetable, using retirements, transfers, and, where essential, layoffs. At the supervisory level we now have five hourly wage supervisors, an assistant plant engineer, a machine-shop foreman (who also supervises millwrights and mold-setters), and a foreman over electricians, carpenters, and pipefitters (he also supervises power plant and sanitation). This manpower revision was tied in with the gradual elimination of non-specialized outside services. By utilizing our own millwrights, we now save a substantial sum in rigging charges.

## 3. WE REVIVED WORK ORDERS

Most work orders were spot calls for trouble or routine maintenance. Calls were so frequent that little time was left for PM. Maintenance dispatching was poorly handled and not followed through. We had a work-order system in name only.

For better maintenance control, we ruled that only operating foremen and superintendents can request work orders on production equipment, and executives or office management on office equipment. These requests are forwarded to a maintenance clerk who logs them in record books for each craft. Craft workers make daily checks of the logs to assign jobs, clock them in and out, and mark completion or reason for delay. Emergencies are phoned to foremen or craft leaders.

## 4. WE STABILIZED MANAGEMENT

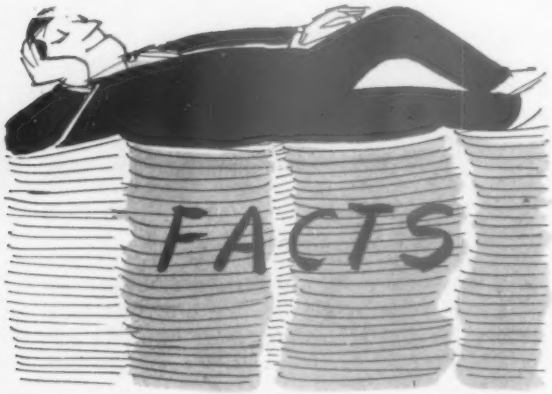
An improvement program needs constant checking, follow-up, and revisions. Here emphasis shifts from engineering to management. Our discipline for action is based on three general aims and a system of checks, reviews, and publications.

In general, we (1) use consultants, especially for long-range plans, (2) provide prompt and efficient service to departments, and (3) complete at least one major improvement each year.

Our *checks* include weekly meetings with maintenance supervisors on one-shot jobs, PM schedules, weekend work, and complaints. We also make periodic and annual checks of maintenance costs and variances. *Reviews* are made every six months (on manpower, downtime, etc.) against established goals. Once a year (about the time of physical inventory) we sum up and schedule the next year. *Publications* vary from special reports on PM failures causing breakdowns to capital and expense budgets, correlated with appropriation requests and the improvement timetable. Finally, we provide operating instructions for the emergency handling of all basic equipment.

**Incentive revision can be accomplished. This five-step plan will work for your plant...**

1. Make a firm decision




3. Get the facts

4. Give and take

# YES, YOU CAN REVISE YOUR

Too many company managers have let incentive plans run away with themselves—deteriorate to the point where their basic purpose of extra pay for extra effort no longer exists. Why?

They have used boys, instead of men, to set time standards—a false economy. They have cut industrial engineering manpower, disregarding the impact on incentive maintenance. They have failed to train supervision in incentive administration. And have bargained away the basic rights of management.

Even with the stark fact of lost production staring it in the face, management still has a tendency to shrug its shoulders at the idea of incentive revision: "It can't be done."

But it can. On the two pages following there is a five-step program. While it's not a magic cure-all, this program can help management brush that monkey off its back. And it can realistically modify an incentive system in a way that will prove fair to both employee and employer.

It not only *can* be done—*it has been done* in many plants.

By T. J. WIECZOREK, Vice President
George Fry & Associates, Chicago

Here are four examples of such system revisions:

• **Plant with a ceiling on earnings**—Employees set their own standards. They worked hard up to the point of an unofficial ceiling on earnings, then sloughed off at the coke machine.

What was done? The original high-task level was re-established but the quasi-official limits on earnings were removed. Result: Earnings increased while production costs decreased.

• **Plant with peak-and-valley standards**—In the operation of polishing raw castings to a satin finish, employees felt the standards were tight. They by-passed quality to get earnings. If management wanted better quality, it would have to allow them more time, they insisted.

What was done? Standard data guides were established. All new studies were compared with these guides. Where variations occurred, investigations were made. Standard data could only be used as a guide because the union insisted they were not valid for this type of work. Result: Standards and quality leveled off. Earnings continued to fluctuate but peaks and valleys were minimized.

• **Plant with an intricate plan**—The original plan was a quick-rise curve that leveled off. This resulted

2. Communicate

5. Get it started

# INCENTIVE PLAN

in workers deciding at what point additional earnings were no longer worth the effort involved. If they produced more, they would, of course, earn more money, but at a declining rate. They pegged production. Management raised the curve from the point of their peg, something less than 1 to 1. Workers upped output but again pegged production.

What was done? The entire plan was revamped, made a 1 to 1 plan. Result: Pegged production was eliminated.

• **The plant with "booby-trap" measurements**—Its incentive plan included payment to indirect workers (foremen included) proportionate to the earnings of the direct workers. It made no provisions for the reduction of the indirect crew when work loads decreased. Foremen transferred slower direct workers to indirect jobs during slack periods, leaving the best producers on direct jobs. The higher ratio of indirect labor received higher incentive pay. Total pay skyrocketed.

What was done? Ratios of indirect to direct labor crews were established with bonuses depending upon the maintenance of these ratios. Result: Indirect crews are now reduced when direct work drops.

*Turn the page*

Dayco Corporation, with the help of George Fry & Associates, revised obsolete incentives in its two plants in Waynesville, N.C., and Dayton, Ohio. Employees at both plants are represented by the United Rubber Workers' Union.

## Here's how Dayco did it in Waynesville

The basic problem at this mechanical rubber goods plant was simple. The antiquated incentive system allowed employees to peg production. At the time the plan was revised 650 of 1000 employees were on incentive. Several conditions contributed to the over-all problem:

• Base rates, on which incentive earnings were calculated, ranged from 40 to 70 cents per hour. Wage rate increases totaling 93 cents per hour were added to the base rates *plus* incentive earnings. For several years the union tried to increase the base rates to include the full 93 cents.

• The employees limited production to 156% of task. They would examine a standard, compare it with the amount of work they had to perform to produce 156% and decide whether or not the standard was acceptable. If it wasn't, they grieved. This frequently resulted in a relaxed standard.

• Average earnings were paid for all work not on standards.

• The company and union had agreed to review all base rates and incentive standards and to incorporate the wage increases into base rates. But there was no agreement on how to do it.

SOLUTION:

The parties agreed to revise the incentive plan to include:

1. A standard-hour high-task plan with no limit.
2. Base rates to include the "adder."
3. An increase in base rates to compensate for the lower earnings expected with the new plan.
4. Payment of 110% of base rates for all non-standard work.
5. Union participation in the development of the new plan.

Both union and company gained from the give-and-take negotiation that resulted in the plan's installation. The company obtained labor savings and distributed burden, since the employees no longer pegged production. The union gained a large increase in guaranteed base rates. Not one employee lost his job through the revision because total output (and sales) increased.

# ...but a technical approach won't do. Incentive revision is

*And here's the five-step program you can follow to institute incentive revision in your plant.*

## 1. MAKE A FIRM DECISION

All managers realize that the only answer to rising competition is top productivity proportionate to labor costs. Competition demands a fair day's work from each employee. Decide firmly to revise your incentive system with this premise in mind.

There are many specific reasons for the failure of incentives. The use of average hourly earnings is probably the most prevalent. Some managers admit this practice can lead to output levels as low as 50% of day work.

Whatever the reason, the road back must be trod cautiously and on a step-by-step basis. The abuses and inefficient work habits that have contributed to labor-management mistrust have sometimes taken years to develop. They cannot be undone overnight. While security seems to be paramount with day workers, incentive workers are most sensitive about their work load and take-home pay. They will not accept sudden drastic changes.

No union will subscribe to a change that radically and suddenly alters the average take-home pay of its members. They are concerned about inequity of the work load and will usually subscribe to the principle of a fair day's work. But they will not tolerate a reduction in earning power.

## 2. COMMUNICATE YOUR DECISION

You know your present incentive plan is in crying need of revision, but it's no use trying to tell your story just in terms of statistics and technical jargon. Incentive revision is primarily a human relations problem. In fact, as soon as the human knots are untied, the technical features fall easily into place. Management must lay the groundwork for revision by telling all concerned that it intends to raise the productivity of employees and capital equipment—without cutting take-home pay.

## 3. GET THE FACTS

Management must be armed with facts to negotiate in strength with the union. For instance, the union may regard average earnings as a gain hard-earned by negotiations or strikes. The union places a monetary value on these gains and will not give them up easily. At negotiations management should be in a position to answer effectively any and all doubts the union may have regarding the new plan. It needs these data:

1. Unit costs. What are present unit costs? What reduction can be expected with incentive revision?

2. Cost of revising the plan. What is the total cost? Figures should include any wage rate increases that may be incurred in negotiating the change, as well as engineering and clerical costs.

3. Who will earn more? Who will have to work harder? Management should have available a sufficient cross-section of the operations to indicate the group of employees that will gain in earnings and the group that will be required to increase output for the same earnings.

4. Permanence of the new plan. It is necessary to develop the proper controls for the administration of the new plan. The wholehearted support of managers who have lived with the old plan won't be gained unless they are convinced of permanence.

## 4. GIVE AND TAKE

Be flexible in negotiations with the union. Be ready to give and take.

The union will want to know whether earnings are going to increase or decrease, and in what areas increased effort will be required. Don't be afraid to substantiate facts with examples. You won't shock the union.

It is surprising to note how many union committees consider work-load equity to be a problem and are willing to discuss remedies. Organized labor will cooperate when facts are well documented.

If management is to convince the union of the need for change it must be prepared to demonstrate that this change will be fair to both company and labor.

Management must set down sound rules and regulations for the administration of the new plan. The union is not going to accept "a pig in a poke."

A new plan, based on increased productivity, is going to cause a certain amount of employee displacement. Unless increased business is anticipated, management should be frank about this at the outset. If the union is not forewarned at negotiations, and displacement occurs during installation, relations may become strained at a critical point.

When the facts are on the table, management has an alternative to wage-incentive revision. It can revert to base hourly rates as a means of payment. This is seldom effective. The union demands base rates equal to or approaching the average earnings of the incentive workers. At the same time, the company has no guarantee that productivity will be maintained. Wage inequities are created and the whole level of the wage-rate line seesaws in trying to eliminate inequities. Also, productivity eventually drops to a daywork level—70% of a day's work or even less.

## 5. GET IT STARTED

The final and most important step is translating your negotiations into a workable plan. Although details vary from plant to plant, let's take one example of incentive revision that works.

Each employee makes at least his former average hourly earnings based on a typical prior period—provided his output is high enough. Here are the provisions for the payment of average earnings under the revised incentives:

- A worker must remain on the same job he held

# a human relations problem

under the old plan. The guarantee of average earnings diminishes over two equal periods of time, ranging from 3 months to a year.

- During the first period, an employee receives minimum average earnings as long as he maintains a weekly average performance of at least 120%. Any week he falls below 120% he gets his base rate, plus his incentive earnings under the *new* plan.
- During the second period, the employee's minimum pay is half the difference between average earnings and new incentive earnings at 120% performance—if he maintains a minimum weekly average performance of 120%. If he drops below this, he only receives earnings calculated under the revised incentive plus base rate, as in the first period.
- At the end of the two periods, the employee is paid according to the revised incentive if he's still on the same job. Base hourly rates become the minimum pay. If he changes jobs during this time, he is paid at the new job rate.

Here's how it works out on a simple job:

Average hourly earnings under old plan = $3.50
Hourly earnings under new plan at
120% performance ..... = $2.70
Difference ..... = $ .80

First-period earnings for weeks of average performance of 120% or more are $3.50 per hour. For weeks when average performance is less than 120%, earnings are something less than $2.70 per hour, depending on actual performance.

Second-period earnings are calculated the same way, but the $3.50 per hour guarantee is reduced to $3.10—$3.50 minus $.40 (half the difference).

This method usually prevents a sudden loss of earnings. It assures acceptance of the new standards and allows time to promote employees to higher rated jobs as they become available.

During the transition period, unnecessary "bumping" of a worker is avoided because he would thus lose the guaranteed pay. Also, some of the differences in earnings could be wiped out by wage rate increases. Employees affected get a "paper raise."

During this period, it's wise to consult with the union on the administration policies. Otherwise, some items may be overlooksd. And, unless the union can participate in establishing policies for these situations, mistrust may recur.

Most likely the union will not want to participate directly in the development of time studies, because of possible loss of grievance privileges. But most unions subscribe to the use of time study stewards.

Revision means re-education. Foremen and stewards must be trained in: fundamentals of time study; wage incentives; establishment of standard data; and contractual clauses relating to wage incentives.

**It's a rare plant where more than 35% of the incentive workers will actually lose money with the institution of correct standards. The other 65% will exceed or at least equal their former earnings through increased productivity under a new plan. Both labor and management gain.**

## Dayco did it again in Dayton

The incentive plan set up during the boom days of the '20s had got out of hand. Labor costs were exorbitantly high in relation to output, and inequitable in relation to job skill. In some cases, performance on the loose standards ran as high as 400%. The system had other problems:

- The union contract required new jobs to pay the same as comparable old jobs, for equal performance. This perpetuated effects of loose standards.
- Another clause required payment of 100% of average earnings for all non-standard conditions, such as waiting for work.
- Excess labor costs were about 15% of payroll.
- Employees griped about inequities. Unskilled men were often higher paid than skilled. One man just above a laborer made $4.50 per hour.

With the decision made, management gathered facts needed for revision with the management consultants. It calculated realistic base rates, under a revised high-task incentive plan.

The facts were presented to a union-company negotiation group together with recommendations by the consultants. The union subscribed in principle—especially where featherbedding applied—but insisted that no one was to make less money.

After tough give-and-take negotiations, these six recommendations were accepted, eliminating most of the major objections to the old plan.

1. The new concept of normal would be used by the consulting engineers.
2. Union time-study men, jointly selected by company and union, would work with engineers.
3. All non-standard payments were limited to 95% of past average earnings, except for training and transfer for the convenience of the company.
4. All incentive rate disputes were to be settled by technically qualified individuals.
5. The consulting engineers would arbitrate disputes involving principles previously agreed upon.
6. All negotiated wage increases would be held in escrow until the new system went into effect.

Men trained in the concept of the high-task plan were temporarily added to industrial engineering.

Supervisors received formal (and union members informal) training in the new plan.

Before the new system was instituted, engineers, supervisors, and a union representative met with employee groups. They explained what would be done, and how it would be done.

A big order can be a mixed blessing when it calls for a radical change in production materials. When it happened here, managers learned fast the art of . . .

# CONTROLLING THE IMPACT OF TODAY'S NEW MATERIALS

A juicy order started things at the Bessemer (Ala.) plant of Pullman, Inc. The Southern Railway wanted some new coal gondolas.

There was one hitch: To increase payloads, they wanted the cars made of aluminum, instead of the traditional steel. Industry experience with the new material was almost nil. A few special cars had been made—all hand-welded—but the industry had never used aluminum on a large scale.

At first glance, things looked fairly rosy. Most of the conventional jigs could still be used. Plant layout was OK, and engineers could convert most production operations (like the giant stamping press at right) without much trouble.

On the other hand, the welding requirements of aluminum forced major changes. First, Pullman had to switch from submerged-arc to inert-gas welding. In addition, since the car ends could no longer be made of pressed plate, each aluminum end had to be built up of 13 extrusions and welds.

All told, Pullman saw six major problem areas developing as a result of the switch to new materials. Sound planning tamed them all.

**FABRICATION METHODS.** In addition to converting welding operations, Pullman used special saw blades instead of torches for cutting aluminum shapes. And extrusions were bevel-sawed to length, instead of being sheared.

**EQUIPMENT AND TOOLS.** Biggest item in this area was a special automatic welding machine, designed and built by Pullman. It simultaneously welds 13 extrusions to a plate to form the car ends. An outlay of $185,000 for new manual welding units was side-stepped by simply connecting different cables to new welding guns and tacking units. Former 300- to 1500-amp. motor generators were used.

**MATERIAL HANDLING.** Pullman couldn't use chains and cables for handling aluminum sheets, as it had with steel plates. And floor sheets were almost 47×10 feet. Solution: Pullman designed and built a set of five special vacuum-lift units, each with 10 suction cups to a side. The new device worked so well it has been used with steel ever since.

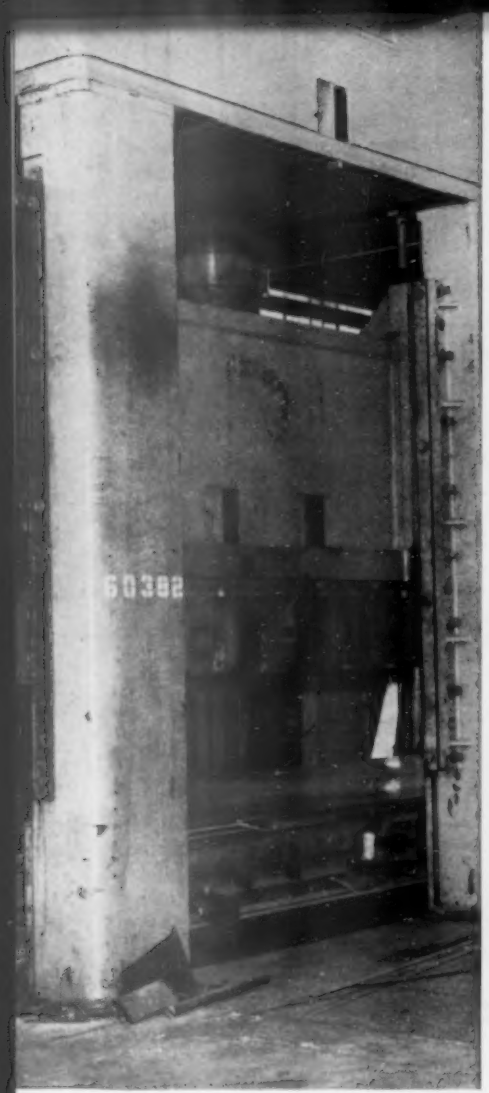
**MATERIAL STORAGE.** Steel shapes can be stored outside, but aluminum tends to discolor and oxidize, and is more vulnerable to damage. So Pullman converted an in-plant track, not needed as an assembly line, into a storage area.

**TRAINING.** Bessemer plant welders had no experience with aluminum. They had to be taught how to avoid buckling, how to maintain proper arc length during inert-gas welding. Three welding specialists were called in from another Pullman plant to conduct the training program. First, 18 supervisors were trained. They, in turn, trained their welders—about 200 in all.

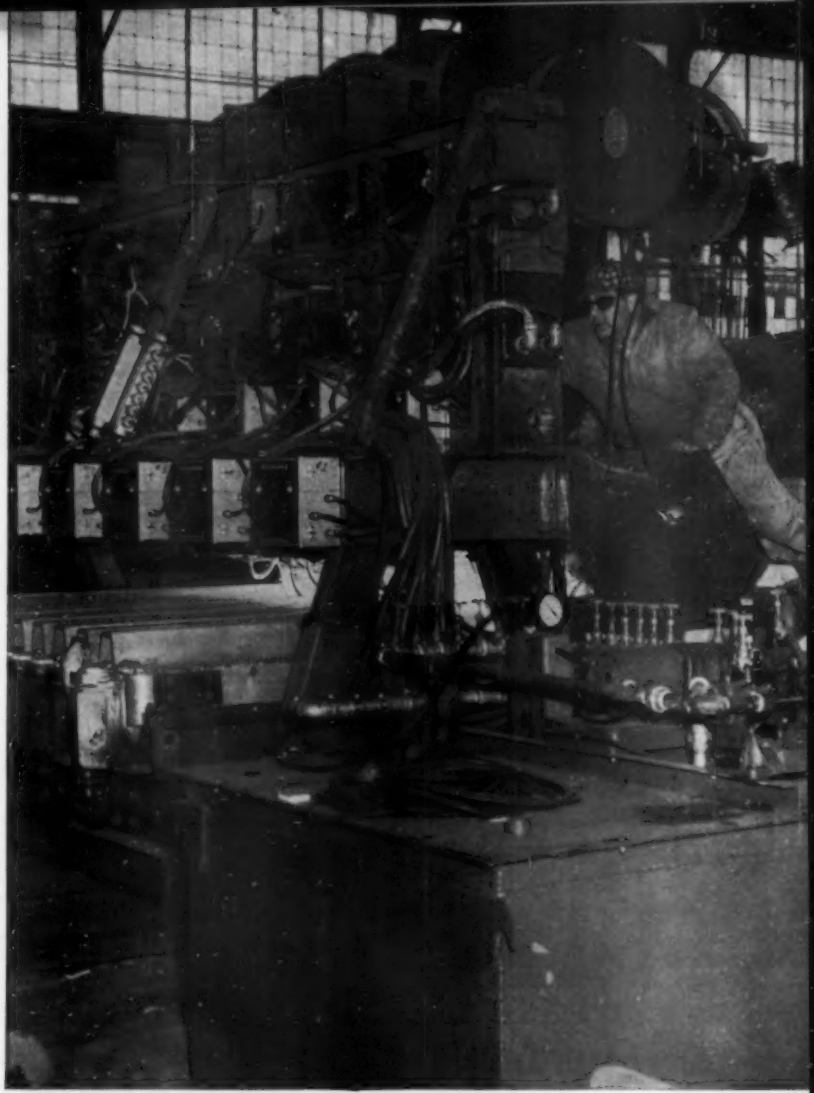
**HAZARDS.** Aluminum edges can slice a man up pretty badly if he's either careless or improperly equipped. And burns from argon welding arcs are brutal. Solution: for metal handlers, heavy gloves; for welders, a cap and shroud to protect the exposed skin not covered by the usual welding masks.

Net result of Pullman's realistic planning: 750 aluminum railroad cars were rolled out, two an hour, when the operation hit its stride.

**FORMING** (above) aluminum bottom sheets for coal gondolas on giant press that normally shapes steel plates. Here worker guides sheet that will become a gondola floor.

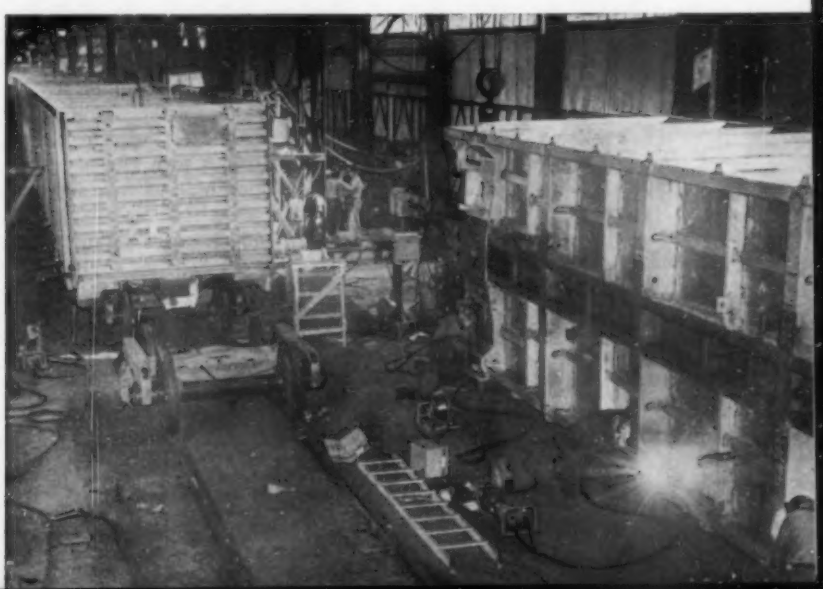



**HANDLING** (below) unwieldy aluminum bottom plates is easy with this specially designed vacuum-cup lifting rig. Elimination of chain and cable lifting speeds up stacking, protects soft aluminum surface. Device is now used on steel.



**WELDING** (above) aluminum extrusions that become gondola end plates is done with this huge automatic machine. Designed and built by Pullman-Standard engineers, the machine represents the only major rejigging required for the project.

**FINISHING** (below) is started in this "turnover area" where cars are tipped on their sides and down-hand welded. Here workers join bottom cross-bearers to the side sills of the gondola. An in-plant track serves as built-in assembly conveyor.



**Newest audio-visual tool** for complex assembly operations and production training is this unit made by Applied Communication Systems, Chicago.

# It doubled output in Cedar Rapids

First packaged production tool of its kind, it shows and tells sequence of complex jobs, and trains new workers.

At the end of its first operational day at Collins Radio Company, Cedar Rapids, Iowa, the contents of the small tan box (above) installed in an assembly work station brought raves from workers and cheers from management.

Production of complex electronic units shot up that first day from two to five units per day. The assembly defect rate dropped dramatically—by one half—from 13 per unit.

**What's behind this remarkable system?** Its inventors can't see why it wasn't developed sooner.

Created by a former Hughes Aircraft industrial engineer named Jack Barry, the unit was designed specifically to solve extreme production problems.

Barry now heads up Applied Communication Systems, division of Science Research Associates, Chicago—which markets the system.

The packaged unit consists of a small 35mm projector, a self-contained sound-tape speaker with attached earphones and a built-in music system.

On any complex assembly operation, each step appears, in color, on the screen. At the same time, the taped program barks synchronized instructions. Between instructions, the worker's psyche is soothed by a selected musical score. The music fades for delivery of the instruction.

Barry reports that in three installations to date ACS or its clients have encountered no union trouble.

One reason for this union acceptance is the fact that each operator can control his own rate of instruction and output. Excessive standards are not forced by the system.

A second reason for union cooperation is this: Before any company decides to make a test installation, meetings are held with members of labor and management. ACS engineers explain the complete system, its advantages and limits.

There *are* limits. The system is not effective in production sequences that are high-frequency, repetitive, or one-shot specials. It works best in work cycles of at least 30 minutes.

Asked about psychological impact, an ACS spokesman said there probably is a Hawthorne effect. That is, after the novelty of the unit wears off, the spectacular jump in production rate may level off to a slightly lower plateau—but still much higher than was possible without the unit.

**Here's what makes this system different from similar devices you've seen in FACTORY.** (For an example of a home-made unit, see the cover story for FACTORY's May 1960 Case Book.)

- It's a neat, complete package.
- You get skilled help in presenting the system to management and employees.
- You get instruction on programing—making slides and tapes—when you buy the unit.
- You can get the unit built into an efficient work station if you wish.

According to Barry, here's how the system can be installed in a plant:

First step is a survey of operations by an ACS engineer to determine the production, inspection, training, and testing locations where maximum benefits can be achieved.

Then two or three men are chosen from production and engineering. One should be familiar with time standards, another a manufacturing engineer, the third capable of becoming a good technical cameraman. These men get an intensive two-week course in audio-visual production methods at ACS Communications Development Centers in Culver City, Calif., or Chicago.

The newly trained company team then returns to the plant and, under the watchful eye of the ACS engineers, proceeds to organize the photo and sound procedures required to install the A-V system.

Once the system is operating, the ACS team withdraws. But, it's available for advice when needed.

An alternative plan would put the ACS engineering team in residence at your plant for about six weeks. During this time it would install the system and train personnel.

Cost for instruction, eight complete work stations, and two spare A-V units: about $20,000. The cost is somewhat less for instruction and units without work stations. Cost of units like those above: $540.

... SHOULD

PLANT MANAGEMENT YOU PLAY THE GAME OF POLITICS?

PART 2

NBC Photo

## You'll find more than hurrahs

# INSIDE THE POLITICAL ARENA

**For November's candidates the hurrahs are ending. For management, the game of politics is just beginning. Indeed, to consider politics just a biennial battle is wishful thinking. To consider it anything but a timeless, ever-vital part of your management life is folly.**

**Even now the pros are shaping their plans for the next election, and the one after that. To help shape your plans read on.**

By LAWRENCE F. MIHLON
Associate Editor, FACTORY

Every day the move by management men into one of the many facets of political activity gains momentum. Large companies and small are eyeing the bandwagon with deep concern. Too many of them, it is feared, will ride it only as long as the current national political fever jogs the country with its promise of excitement and uncertain reward.

The game of public affairs is a lot more serious than that. And it's a lot more complex—not hard to understand, but more complex than some novices like to think. That's why FACTORY urges *you* not to enter the political arena with misconceptions that may block your chances of ever becoming effective.

Take, for example, an advertisement recently offered the public by a prominent mid-west machine manufacturer. In it the company weaves a "fairy tale" about two brothers—one works like mad to become a success in business, the other chooses the government as a career. The ad tells us the first lad is eventually entrusted with the affairs of a $200,000 company—affairs that he must make pay off, or else . . .

Later, the second fellow, now working in government, is given charge of a bureau where he spends "millions and billions with no obligation to make a profit—or even to make sense." In closing, the fairy-tale ad proposes to switch the two brothers—thus cutting millions out of the bureaucrat's budgets, and causing the bureaucrat to die of starvation.

Obviously, the ad writer never experienced the complexities of government and politics, the various checks and investigations into the affairs of a top spending government office. He seems to think success in business necessarily means super-success in government.

It is naive assertions—or wishful thinking—like this that can undermine your chances, as a plant management man, of ever being wholeheartedly accepted into the political fold.

Fortunately, most architects of the management move into politics have trod the road more sensibly, and insisted that before actually stepping into the arena, managers must be well grounded in the social, legal, and operating fundamentals of political activity. (See FACTORY, June 1960, page 82.)

As a result, a hard core of companies are already integrating political affairs programs into their management organizations at the plant level.

More and more professional politicians are endorsing the move as a healthy one for both parties.

## ALLEGIANCE TO NO PARTY

It is the insistence on non-partisanship that has served best to get the management move into politics accepted by professional politicos, the public, and, in some local cases, labor unions.

A case in point is the increasing concern being expressed by Democrats and Republicans over the acceptability of the "conflict-of-interest" laws—which require any individual ascending by appointment to public office to divest himself of personal business holdings. Recently elected officials have also been subjected to unwritten restrictions relating to conflicting interests, and forced to "make a clean breast of things."

Speaking before the recent graduating class at Notre Dame University, President Eisenhower deplored the too-rigid interpretation of these laws "which have often prohibited the entry into government of men and women who had much to offer their country.

"We ought not to make it inordinately difficult for a man to undertake a public post and then return to his own location," the President said.

Just a few days before this Eisenhower indictment of the conflict-of-interest laws, a leading Democrat warned Congress to be wary of the laws. Senator Henry M. Jackson (D-Wash.), chairman of the Senate Committee on National Policy Machinery, said this to the Senate group:

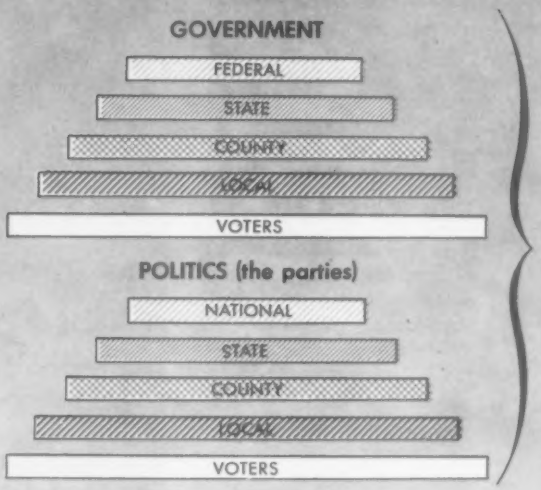
"The so-called 'conflict-of-interest' laws—passed many years ago to bar dual allegiance to governmental and private interests—are out of step with the economic realities of the twentieth century. They also run counter to the government's needs for talent."

Whether from professional politico or management novice, talk about management's move into public affairs centers around the individual. Both sides agree that in the end it is the individual who makes the difference in any political operation.

Therefore, it is the individual who must know the difference between government and politics, where he can best exercise his rights as a citizen, and where he should direct his company's efforts.

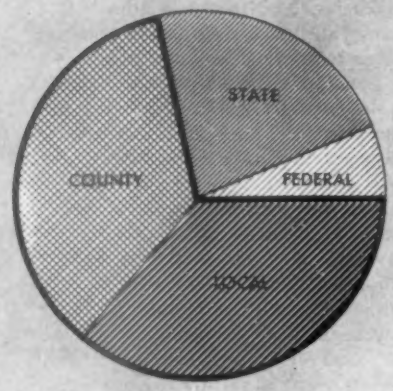
So that *you* will have a better idea of where you or your employees can do the most good, let's review briefly the structure of government and politics.

### The political mix: how it affects

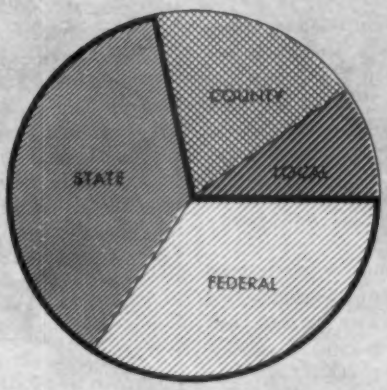



**The party committee** is the key unit in the game of politics. It is responsible for platforms, nominations, elections, patronage, and personnel advancement and reward.

**your plant's operations; where you can make the greatest impact on it.**




**Everyday operations are affected most** by your county and local governments and political organizations.




**Corporate policies are affected most** by state and federal governmental and political decisions and maneuvers.

**Management men can be most effective** in developing good government by working within the party committees.

## GOVERNMENT IS NOT POLITICS

Ross Nichols, vice president in charge of public affairs of Daystrom's Weston Instrument Division, Newark, N. J., presents this observation on politics:

"I consider politics the vehicle for accomplishing an orderly change in the objectives and personnel of government at all levels."

Nichols approves of management people who may become members of the legislature, freeholders, mayors, or councilmen, or who may be appointed to a zoning board or a board of education.

"In all these jobs," he says, "they should and can make a contribution to better government.

"But the political apparatus has the responsibility for developing platforms and candidates, and, in my opinion, management people can have greater and wider influence in the political committees than by holding office."

Nichols supports the premise that, before leaving the confines of his home for the gregarious rigors of public affairs, a manager should understand the difference between government and politics. That is, realize they cannot exist independently and, indeed, are hopelessly entwined. Sometimes the changing face of government demands alterations of the political course. But more often, the decisions ironed out within the party determine the course of government.

Working within a political party, you have the opportunity to try out various approaches to the philosophical composition of government. Yet you're constantly reminded of the practical facts of life that, in the final analysis, determine the governmental platform of the party.

Since internal party activity is usually the best stepping stone to public office—though not always—most political encouragement plans suggest party volunteer work as the first deck upon which the novice should try his political legs.

Another good reason for party participation as an initial gambit (though not a very glamorous one) is that there are more jobs within the party than in government. Also, it gives the party incumbents a chance to give the newcomer the once-over.

Of special interest to plant management men is this fact: Legally, there is no conflict-of-interest restriction placed on party workers and wheels, no matter how powerful they may become. (Certainly there is inconsistency here—if we agree that in many areas the elected and appointed public officials are merely puppets of the party manipulators.)

In physical appearance, party and governmental structures are quite similar. Each is a pyramidal organization. At the base of each, organizationally, is the local or community unit. In a political party this layer is two-piece—with the precinct at the very bottom—city, ward, or district right above it.

Above the base level (upon which each succeeding layer in government or politics depends) are the corresponding strata of the county government and the county party committee; the state government and the state party committee; the federal government and national party committee. Each exerts influence on its counterpart and *vice versa*.

## IN SUPPORT OF THE GRASS ROOTS

With the picture of the pyramidal structure of government and politics in mind, it is not difficult to see why virtually every political activity program today stresses the grass-roots approach.

How important is this approach? A little-reported event at the 1960 Republican National Convention

## WHAT THEY'RE SAYING ABOUT
### plant management in politics

**Richard M. Nixon, Vice President, United States**
"Both of our major parties need new blood and new leadership, not just at the top, but in the states, in the districts, in the counties, and in the precincts. I urge those who have worked in campaigns before to continue to work now, not simply in the two-month period of a presidential compaign, when everybody is excited, but over the long haul."

**John F. Kennedy, Senator from Massachusetts**
"The businessman (manager), like other influential and significant members of our society, should have ideas to offer in the political arena—compelling, penetrating ideas upon which the legislator can act."

**Herschell C. Loveless, Governor of Iowa**
"I approve of (management activity in politics). The main rules I would suggest in political participation are to strive for fairness and to stress reason and logic above emotion and prejudice."

**David S. King, Congressman from Utah**
". . . I think that once a political consciousness is stimulated, (plant management) will have no difficulty in finding a significant role to play on the political scene."

**Harrison A. Williams, Senator from New Jersey**
". . . I believe that political action (by plant management men) can best be expressed through existing political parties. Individuals should be aligned with the *party* of their choice rather than with a particular economic group."

**Frances P. Bolton, Congresswoman from Ohio**
"Knowing the successful results of a number of (political activity) programs carried out by industry in this area, I certainly feel that management has not only a responsibility but a very real contribution to make to politics."

**Barry Goldwater, Senator from Arizona**
"In our family's stores . . . we have had a very favorable reaction to our policy of encouraging employees to openly participate in partisan politics. We have actually given leave of absence to members of both parties who wish to actively campaign or work for their parties at election time. This had no unfavorable reaction among the employees."

**Edmund G. Brown, Governor of California**
(through A. H. Pope, legislative secretary)
"The local political organizations are usually the best judges of what is most important in their areas. I would recommend a direct telephone offer of service (by plant management men)."

tells you just how important the grass-roots approach can be.

Speaking to a group of local delegates, GOP Presidential candidate Richard M. Nixon dramatically told his supporters a story of how his party lost a special senatorial election in North Dakota—by one half of a vote in each state precinct.

"The man at the precinct level is the most important in any election," the Vice President said.

He urged his listeners to return home and rally the voters in their individual precincts. He advised them well when he insisted that the precinct party worker makes the difference.

Inside the party itself, however, in the struggle for platform recognition and control *the county* is generally the key unit. Reason: It controls the two base levels immediately beneath it—the precinct and the city unit. In some areas the County Committee may even elect the Congressional District Committee. *This is indeed grass-roots politics.*

And it's at the grass roots that plant management men can make the greatest contribution—and at the least risk of having the activity interfere with their management function, most authorities agree.

For a complete list of where *you* can play the game of politics in your community, see the checklist at the right of the facing page.

## WITH THE COMPANIES

In FACTORY's first article dealing with plant management and the game of politics, we introduced two company-sponsored political activity programs.

The first program, created by Ford Motor Company, was a comprehensive affair with eight regional offices of civic and governmental affairs, and a central staff of 45.

The second belonged to a small company, New Jersey Machine Corporation (Hoboken). It was constructed around the U. S. Chamber's "Action" course and involved the energies of only a handful of men and the outlay of coffee and doughnut money.

What progress have they made in four months? What are their plans for the months ahead?

Pivot point of the Ford program is a practical politics course aimed at giving supervisory personnel, initially, a look inside the workings of the parties and government. Just being introduced as we went to press in June, the program has to date enrolled 35% of the supervisory employees to whom it was offered. Most of this number have either already completed the course or will do so before the current election race comes to an end.

Ford reports that both political parties have been most cooperative in providing qualified local leaders to meet with its political activity classes.

A check with United Auto Workers (AFL-CIO) reveals no official reaction to the program—either endorsing it or attacking it.

At New Jersey Machine, Vice President Richard F. Dede reports steadily growing enthusiasm among his 30 "Action" course graduates. Three or four employees are expected to carry their party colors in the coming election.

When NJM resumes operations after a summer vacation shutdown, the group plans to candidly appraise the platforms of both major parties in the hope that more intelligent voting will result.

Early this summer another company completed first steps into the political mix when about 1000 persons attended the graduation of Republic Steel Corporation's class in Building Political Leadership.

What the students went through to obtain their diplomas contributes a new dimension to our story.

Briefly, the Republic program consists of 12 two-hour conferences and three workshops. In what is called bi-partisan fashion, the program explores everything from "The Meaning of Democracy" to "Waging a Campaign and Winning an Election." In this respect the program differs little from others.

Here is where it does differ:

- Each conference leader (always a Republic employee) is sent to the College of William and Mary, Williamsburg, Va., for one week's intense training in the subject matter to be presented by him.
- Invitations to join the class are extended to all salaried employees, *and their families*. In special cases, hourly workers are also welcomed.
- The conferences are evaluated through gradeless multiple-choice and opinion tests (unsigned by the student) given by staff members of the college.
- The college awards graduation certificates only to those who complete the course satisfactorily. That is, maintain a 90% attendance record and complete the series of "leanings tests."
- Republic has produced a 20-minute motion picture film for each of the 12 conferences. Each film is narrated by a leading authority in political science.

The big steel company now makes available through its Cleveland offices, or through William and Mary, the complete package of films for use by other companies, civic groups, or schools. Cost: $125.

## A QUESTION OF EVALUATION

As with any new management concept, the political activity program must eventually face the unavoidable question: How do you evaluate its success?

Certainly, underlying any program is the hope that if you and your people participate, politics and government will be better managed. You take a calculated risk that if better-managed government can be achieved, industry will benefit.

But a political action program is an intangible, not unlike public relations. Evidence of success often cannot be seen in terms of direct, tangible benefits to your company. Even if legislation favorable to industry is passed, it may not be the result of *your* program. It may not directly affect *your* industry.

Thus, profit-and-loss evaluation of your political action program is unrealistic.

However, you can do these things:

- Record the number of program participants voting in any election and compare with previous habits.
- Compile periodic dossiers of program enrollees actually *playing the game* and compare with past habits.

To ensure honest results, use questionnaires offering the protection of anonymity.

### WHERE YOU CAN GET ACTIVE
### in the game of politics

- Help organize training-in-politics courses.
- Serve as discussion leader for such courses.
- Serve on the Public Affairs Committee of your trade or professional association.
- Join or organize a political club, such as:
  - Young Democratic or Young Republican clubs.
  - Women's Republican or Democratic clubs.
  - Senior Citizens' clubs for older people.
  - Neighborhood political clubs.
- Work at your party's headquarters where you can:
  - Prepare campaign materials such as leaflets, news letters, and other publications; design posters, etc.
  - Join the telephone squad calling unregistered voters.
  - Answer telephone, distribute literature and materials.
  - Provide legal advice, if qualified.
  - File records and correspondence.
  - Type letters, stencils, and copy for printed materials.
- Join or organize a speakers' bureau to present the facts on issues and/or candidates.
  - Help arrange engagements for speakers.
  - Make speeches yourself or write for others.
- Become a member of your party's research committee and compile information for use in election campaigns.
- Serve on a candidate's campaign committee as:
  - Fund-raiser
  - Block worker
  - Sound truck driver
  - Writer
  - Speaker
  - Buyer of advertising space
  - Ad designer
  - Poll worker
  - Campaign manager
  - Radio-TV liaison
- Help organize mass meetings and rallies:
  - Plan programs.
  - Promote attendance—sell tickets.
  - Keep books, records, etc.
  - Find and brief speakers, escort them to meetings.
  - Serve as master of ceremonies or chairman.
- Help your precinct captain, or become a precinct captain yourself. Some of the things you can do:
  - Prepare voter index cards and lists.
  - Address envelopes for mailing party literature.
  - Canvass house-to-house to find out who is registered and to remind people to vote on election day.
  - Help organize special "flying squads" in your neighborhood to canvass, solicit funds, pass out literature.
- Recruit new party workers in your neighborhood.
- Help organize and run schools to train precinct workers.
- On election day:
  - Provide transportation to the polls.
  - Serve as poll or registration watcher, or as poll clerk.
  - Distribute campaign literature for the party.
  - Baby-sit while mothers vote.
  - Carry messages between the polls and party headquarters.
- Become a delegate to your party's precinct, ward, town, county, district, or state caucus or convention.
- Encourage people to participate in politics by speaking at church, civic, fraternal, and other group meetings.
- Serve on study groups and commissions (tax study groups, for instance) formed by your party, town, or county.
- Help to get names on petitions for candidates who need a certain number of signatures to file for office.

**IN-PLANT TRANSFERS** (left) absorbed 1300 employees overnight when the government cancelled Sperry's contract. In interviews like this, the bumped job-holder has to demonstrate his ability to read prints and layouts fast. **OUTSIDE PLACEMENT** (below) of over 125 employees caught in a mass layoff came from Sperry-sponsored interview with some 50 neighboring companies.

When your time comes, use

# LAYOFFS to STRENGTHEN MORALE

"The 'bomb' struck in the form of a call from Washington, two Saturdays before Christmas." That's how Bill Beilby, assistant to Sperry's VP for industrial relations, tells the story.

The call alerted Sperry Gyroscope Company (division of Sperry Rand Corporation), Great Neck, N.Y., to an imminent cancellation of a major military contract. In two days it would affect over 2300 employees on its Electronic Counter Measures (ECM) project. But in those two days Sperry produced a plan for limiting the layoff to 600 employees.

## FACED BY A TOUGH SITUATION

"Our problem was large-scale and complicated," says Beilby. "But we learned a lot from this experience that is applicable to any layoff, no matter how small or routine it may appear. *We now know that employee morale need not be crippled by layoffs*—provided a company moves fast and positively enough, and communicates its good intentions and job-saving decisions to its employees."

Sperry faced this problem: Of 18,000 employees, about 2300 were on the ECM project. The ECM contract was so written that the military could cancel all financial obligations within two or three days. Further, Sperry's hourly workers are represented by two locals of the International Union of Electrical Workers (one local for production and maintenance workers, another for shop clerical), and its engineers by an engineers' association.

## START WITH CLEAR OBJECTIVES

From the outset, Sperry set three objectives for its redeployment program:

**1. Speed.** Time was costing money—lots of it.

**2. Flexibility.** The company wanted to retain a good balance of skills. It regarded its engineering force as invaluable and at the outset declared that no professional engineers (400 on the project) would be laid off. In addition, Sperry wanted to control the ratio of indirect to direct employees. This ruled out any make-work assignments.

**3. Fairness.** The company had to comply with its various labor agreements on seniority and layoffs. But it also wanted to demonstrate its desire to be fair to *all* employees—union and non-union.

## INCORPORATE RAPID PROCEDURE

Within a few hours of the telephone alert from Washington, Sperry officials (led by Lisle L. Wheeler, vice president for industrial relations) sprang into action with a plan that would do these things:

• **Identify affected employees.** Of the 2300 people, about 700 were members of other Sperry divisions who charged their time only against the projects. Various division managers were consulted for whereabouts of ECM personnel.

• **Estimate employee surplus.** Sperry had to determine how many employees could be retained economically. Commitments to accelerate deferred

research and development programs were secured from top management. All hiring was frozen in order to fill existing job requisitions with ECM employees. Immediately, Sperry announced in writing to its employees that only about 600 of them would be laid off.

• **Assemble skills inventory.** Almost overnight, the industrial relations department generated a set of 3x5 filing cards identifying each engineering employee assigned to the ECM project and capsulizing his job qualifications.

• **Accelerate transfers.** The personnel department matched job openings against employees available to transfer from the ECM project. According to aptitude, previous experience, and seniority, transferable employees were screened by supervisors, under observation of a union job-bidding chairman, where required. Screening was simple and straightforward. Key question: Can the employee perform the job?

• **Initiate bumping procedure.** Sperry's comprehensive seniority records enabled the personnel department to determine systematically which employees were likely to be caught in the shakeout.

• **Begin layoff.** First, most probationary employees (349 had less than three months' service) were laid off. Next went low-seniority employees. During a three-week separation period, all were paid in full, handed a letter summarizing the status of their fringe benefits, and offered an immediate opportunity to be interviewed by another company.

• **Operate employment service.** Most unusual part of Sperry's program was the placement office operated in the company cafeteria. Laid-off employees (over 400 used this service and over 125 found jobs through it) could apply here directly for jobs with other companies in the area. Sperry invited over 50 local plants to participate, and 18 employment representatives held interviews. Two dozen other companies offered a list of job openings, which were summarized and given to employees.

## BE SMART ABOUT COMMUNICATIONS

Here are some highlights of Sperry's layoff communications plan: IUE officials were informed of the crisis almost as soon as Sperry officials. Extra editions of *Sperry News* carried facts about size and manner of layoffs directly to employees. Special editions of Sperry's *Information Bulletin for Engineering Personnel* allayed fears in that area. The *Supervisory News Bulletin* kept foremen current on factual developments. Communications directed toward the community included personal reports to local congressmen and daily reports to community newspapers.

"Sperry's considerate handling of the layoffs got favorable mention in the local press, of course," says Lisle L. Wheeler. *"What's more important, we feel that employee morale has been strengthened by this experience."* Said one laid-off employee: "It is seldom that a company has been interested in the future of its employees after a layoff. I want personally to thank you for your help."

"Up to now, management has ineptly handled the problem of labor displacement caused by higher productivity...

"If a labor-saving move is planned–management also should plan what is to be done with the saved labor."

H. B. Maynard, President
Maynard Research Council, Inc.
Pittsburgh

By W. A. Bussard
Associate Editor, FACTORY

FACTORY believes Mike Maynard's indictment of manufacturing management sticks. Because management—busy solving day-to-day problems—has failed to see that times have changed. It has failed to see that managers, as well as workers, must be flexible in our fast-moving economy.

Sure, you can point a finger at the unions, at government, and at the individual worker. All bear some of the blame for the present 5% unemployment. But it's not blame we seek—it's a cure for the major problem of labor displacement.

In the problem of displaced or "saved" labor it's people we're talking about. Their unemployment is a social problem that touches us all.

A major part of what you do as an operating manager aims toward one thing: the "saving" of labor. It may be a new machine, a new material for simplifying production or simply a more efficient work procedure. But the primary goal is almost always the same: to remain competitive by paring the high cost of labor off the selling price.

What Maynard is saying—and FACTORY agrees with—is that you must include in your labor-saving plans—small as well as large—the final part of the problem: what to do with people who are displaced. If you don't do this, the government eventually will. Spurred by the emotional appeal of unemployed workers and local distress, the public will demand that these social situations be solved. The unions will back such action, as they have in the past.

Don't seek refuge in the notion that you can solve the problem by moving out. There is increasing awareness of broad-scale management measures taken to combat cost pressures (such as shutdown of non-profitable operations or relocation of plants to take advantage of a more flexible labor market). As a result, employees and their representatives view *any* labor-saving improvements with massive resistance. In the long run, moving away from a labor problem area only hurts management.

## AN ENLIGHTENED APPROACH

The constructive, aggressive approach Maynard recommends can take many forms. One unusual but heartening example is that set by Du Pont Company in closing a plant in Niagara Falls. It used the same approach at Arlington, N. J., in 1957.

There were several economic reasons for shutting down the 89-year-old cellulose nitrate plant at Arlington. The old method of production could no longer compete. The product was being replaced with newer materials. Costs of modernizing the old plant were too high. The plant had no room to expand into the surrounding suburban area. The hard decision: Sell the plant.

*Turn the page*

An international authority on work measurement, Harold B. (Mike) Maynard has been called "the leading management scientist" of our time by Dr. Lillian Gilbreth.

## MAYNARD'S STAND:

Excellent as our management skills are today, we need better ones. For if we, and the way of life we love, are to survive, we must face and solve the problem of displaced labor.

I recognize that business is not a charitable institution. It cannot afford to give employment to people who are not needed to do useful work.

But in this process we are dealing with people, not dollars or man-hours or other statistics. If they cannot be employed immediately elsewhere, saved people are a social problem—one that has not been handled well.

I agree that a manager cannot hope to solve all the problems besetting mankind. But he must be concerned with the social problem he helps create by "saved labor."

When management washes its hands of the problem, government or the union—or both—step in. The government's approach is to spread the cost of relocating and retraining saved labor over all businesses by unemployment compensation or by placing a penalty on more than 40 hours of work.

Unions have been more direct—they resist labor changes. Failing in this, they often insist (successfully) that saved labor be employed anyway.

Up to now, management's major effort has been economic education, showing how everyone benefits when productivity increases. But this has little appeal. Workers are more sympathetic to the union leader fighting to keep him on the company payroll, needed or not.

Working people have the same instinct for survival that you have. Education on economic facts may persuade those whose jobs are secure. But it will not gain support for needed changes from those whose jobs are threatened.

Yet most managers have difficulty realizing this fact: Unions will receive support as long as they show a greater interest than management in the personal problems of people.

**Management must offer a positive program. When a labor-saving move is planned, it must include what is to be done with the saved labor. This is the only way to combat resistance to needed change, featherbedding, costly strikes. The alternative: abdication of the right to manage.**

## AN OPPOSITE VIEW

In the words of a manager of one plant about to relocate and lay off most of its work force:

"Management bears no responsibility for solving labor dislocations so long as the company lives up to the labor union contract. It is the responsibility of the government to care for these people. Unemployment insurance and welfare agencies for that purpose are supported, at least in part, by the companies involved.

"Our displaced workers will get no special consideration at our other shops, or at the new plant."

## Du Pont followed a four-step program in closing its plant

**Step 1.** Notified employees of the shutdown as far in advance as possible. Arlington employees had two years' notice. (At Niagara Falls, they have 18 months.) A carefully worked-out timetable notified all employees ahead of the newspapers. The mayor and local service clubs (such as Kiwanis and Rotary) were notified by personal visits. Letters explaining the reasons and the protracted shutdown plans were sent to all employees.

**Step 2.** Established a task force to help employees find new jobs. At Arlington, letters were sent to 150 employers in the Kearney-Newark area listing employees' qualifications. Interviews for employees were arranged at the plant during working hours so they would lose no working time. The plan was successful: Of the 635 employees not retired, 90% found other jobs within the two-year period.

**Step 3.** Gave severance pay, even if the laid-off employee walked out the plant gate to a new job across the street. The amount was based on this formula: one week for each year of service, with a minimum of four weeks' pay.

**Step 4.** Gave vested interest in pension plan to employees not eligible for regular pension during the shutdown period. To discharge its obligation to remaining workers with seniority, the company offered immediate reduced pensions to those within 10 years of eligibility and with 15 years or more of service. An alternative was to take a reduced pension at age 65.

The reaction to the step-by-step shutdown was favorable. Benefits were regarded as generous by employees. The effect on the local community was good. And all employees appreciated the help in finding new employment.

"Careful planning is the key to our success," confirms Du Pont's industrial relations manager, Gordon Mitchell.

The Du Pont shutdowns were massive problems that were handled well. Many of the elements of these large programs would be adaptable to small-scale displacements in your plant. For example, the plan to notify far in advance is just as applicable in your plant as in the giant Du Pont. Helping an employee—from the bottom of the plant's seniority scale—who is about to be laid off, can be as simple as phoning a friend in another plant to recommend the worker.

## MANAGERS WHO CARE

Other rare but heartening demonstrations of progressive management in labor displacement have been those of Haloid Xerox (Rochester, N.Y.) and Socony Mobil Oil Company. To aid long-service workers who were being replaced by mechanization of photographic production, Haloid started a training course last December. For six weeks, selected employees

received average company pay while taking a full-time course in machining and mechanical assembly. Upon completion, they were transferred to a job in another manufacturing department working on production machines. The full cost for each man was about $1900. (See FACTORY, July 1960, page 86.)

In relocating a 78-year-old refinery, Socony Mobil even earned the praise of community leaders in Olean, N.Y., the town that lost the refinery. When starting a new refinery in the Pacific Northwest, Socony offered to move all employees lock-stock-and-barrel across the continent. Of the 350 eligible workers, 150 finally made the decision to move. Those left behind received generous severance benefits, plus help in finding new jobs.

## HOW WORKERS WORRY

Unfortunately, however, this type of planning is rarely applied where it has the best chance of success —in day-to-day, step-by-step manufacturing improvements that displace workmen.

One viewpoint—not uncommon but fortunately less prevalent than in the past—is expressed in the statement in the box at left by one company official. A more typical attitude is: "The new machine permits two men to do the work of four. The two men saved have lots of seniority. They'll both bump to a decent job and a couple of short-timers will be dropped from the payroll."

What this viewpoint obscures is that labor is unqualifiedly afraid of labor savings. The problem cannot be talked around or hidden from them. Workmen desperately want those in control of their work—plant management—to worry about employee security. It's only natural for a working man to want to make sure that every avenue has been tried before his job is taken away from him.

## LOOK FOR A SOLUTION

Here are some avenues to try. Some are short-range, for situations at hand. Others are long-range, to help a company ease the way for technological improvements not yet conceived.

**Short-range solutions**

- You can integrate labor displacement planning with engineering development. Develop a plan for relocating displaced employees at the same time you settle such items as machinery specifications and plant layout. You can build your displacement plans into the project proposal.
- You can retrain employees to qualify them for equal but different jobs. Use available training programs in your company, local schools, and state.
- You can relocate workers within the plant or company, even to other divisions, such as sales.
- You can reduce hiring to make way for displaced people. Personnel planning can be integrated with inventory and schedule planning. (To learn how one company did this successfully, see FACTORY, March 1957, page 96.)
- You can set up a job placement service, staffed by your own personnel people. Enlist the help of other companies in the area. For example, see page 96 of this issue.
- You can give severance pay to displaced workers. This helps them keep their homes on an even keel while they're finding other jobs.

**Long-range solutions**

- You can diversify production to build potential for growth in employment. In this sense, diversification includes re-examination of make-buy practices as well as vertical or horizontal expansion.
- You can cut costs to cut prices and enlarge market. The objective is growth. Many companies need intensification of their cost reduction policies.
- You can develop or take on new products to absorb displacement of employees on regular products. Manufacturing managers can help the marketing people by re-evaluating facilities and equipment in terms of new product potential.
- You can support industrial development activities. All states and many regions and communities have organizations attempting to draw in new industries. Cooperation with these groups may help you steer displaced employees to new jobs.
- You can provide an early retirement option for those employees who can and will take it. You may have to revise your pension plan to do this.
- You can add a "vested interest" feature to your pension plan. This gives an employee the option of taking his equity in the plan when he leaves the company, or leaving it to draw upon when he reaches retirement age.

## WITHIN MANAGEMENT RANKS

In mechanization, management is just beginning to realize that perhaps it bears some responsibility for the skilled worker who is displaced. For example, after encouraging a top-notch machinist to develop specialized skills in a new industry, management might adopt a tape-controlled machine. The skilled man's services are no longer needed. Is management justified in turning the man out—or to a lower paying job—because there is no similar job in its plants? Or should it feel some obligation to help this man, after channeling his efforts so closely over the years to improve company production?

If management doesn't pay attention to this problem, the union or government steps in. The final solution—now out of management's hands—may not be desirable. For this reason alone, disregarding the implications of social responsibility, managers must be concerned with the men they displace.

And don't discount the social responsibilities. As Maynard says, "We need higher productivity to satisfy a universal demand for a higher standard of living . . . to support education, clean up slums, stem the rising tide of crime and juvenile delinquency, and to help fight disease. To do all this, we must solve the great problem associated with higher productivity—displaced labor."

*Turn the page*

# ...There are many other reasons for labor displacement

All fault cannot be laid at the door of operating management's constant drive to save labor in production and maintenance. The actions of labor itself, for example, often make displacement inevitable. But this fact has no bearing on Maynard's argument—or FACTORY's agreement with it. **Operating management must assume responsibility for labor that is saved by operating management's action.**

Of course, operating managers are not responsible for all labor displacement. But you can win support for management's cause by lending your skill and knowledge to the solution of displacement that is *not* the direct result of your actions. The problems are many. Business failures head the list. Today there are 4.7-million businesses in the U. S. The current rate of failure is about 14,000 per year, of which 2400 are in manufacturing.

As Bob Burson, vice president of Dayco Corporation in Springfield, Mo., observes: "A company that goes out of business will displace labor faster than any automatic machine."

## MARKET CHANGE

This was the case at Peninsular Metal Products Company in Detroit a few months ago. Its president sent this letter to all stockholders:

"Although we have pared our operating and production costs to a minimum, our automotive line of business is proving unprofitable. Your management has decided to discontinue manufacture of these parts at the end of the current models."

The result: 600 workers were laid off. Although the company investigated other products, particularly in chemicals, nothing turned up. The union had already given up 47¢ per hour in wages and benefits a few months before and had agreed to revised standards that had increased production. Nevertheless, the plant was forced to close.

Automation couldn't help here. There was no market for the product. The heavy moldings and one-piece window frames and trim made at the plant were not being used on the new auto models.

## CONTRACT CANCELLATIONS

Or, consider the industry that just three years ago was the largest single manufacturing employer: aerospace. Total payroll numbered 909,000—of whom 602,000 were production workers. Today total employment is down to 680,000, which has thrown 195,000 production workers on the labor market. Aircraft are no longer the fashion in government defense plans.

The government's placement of contracts spills thousands on the labor market every month. Says Bob Burson of Dayco: "The federal government enters the unemployment picture more often as a cause of displaced labor—through contract cancellations—than as a solution."

Recent cancellation of an $80-million program on the Corvus missile means unemployment at the gate to 1000 workers. And last year's cancellation of B-70 work forced Lockheed alone to lay off 1000 workers, including 150 professional and technical personnel, at its Marietta plant.

## TOUGH COMPETITION

But government action can't be listed as the main cause of unemployment any more than automation. Any of a number of factors can be of major importance, depending on local conditions.

Singer Manufacturing Company has had various reasons for its recent plant shutdowns. In St. John, Quebec, employment dropped from 2500 to 500 in seven years. The reason: collapse of exports to South America and inability to compete for African markets with a more efficient Singer plant at Clydebank, Scotland. At its Elizabeth, N.J., plant in 1951, 1000 employees were making sewing machine needles. Today, few needles are produced in this country. Foreign prices are better.

In South Bend, Ind., Singer took a year to close down a cabinetmaking plant employing 800 woodworkers. The plant could no longer compete with the 80¢-per-hour wage differential of similar plants in other parts of the country. Local wages (Studebaker-influenced) were too high.

## LABOR IMMOBILITY

Management, unions, government, and the individual worker—all have helped encourage chronically depressed areas. In such locations as Scranton (Pa.), Detroit, and Evansville (Ind.), up to 9% of the working population is unemployed.

This high percentage can be traced to recent labor-management decisions that encourage labor immobility. Increasing fringe benefits (in place of outright wage increases) tie the worker to the locale. Retirement, disability benefits, hospitalization, unemployment benefits, etc.—all require length and continuity of service.

These ties to the company's apron strings encourage the worker to remain with the present employer, no matter what the cut in pay or responsibility may be. Laid-off workers wait for recall—and resumption of fringe benefits—rather than move to new locations and seek new jobs.

## LABOR PRACTICES

These are blamed by many managements for plant relocations. Some call them unrealistic work standards. Some call them low-efficiency standards. Some just label them "featherbedding." But these restrictive local practices did not grow up overnight. They have been allowed to develop in the minds of employees over the years as vested rights. Then one day management wakes up. What it has gradually given away spawns an ultimatum: yield or lose your job.

This is the reason Electric Autolite Company is moving from Toledo. About 450 people will be left

behind when its new $6-million plant starts operating in Alabama next year. Two other plants at Port Huron, Mich., and Syracuse, N. Y., accepted the company's proposal to eliminate restrictive practices and will continue operation. But the 13-point ultimatum was unacceptable to the union at Toledo. (One of the 13 points called for a union commitment that no future wage increases would be demanded.) Hard feelings as well as 450 people will be left behind in Toledo.

### LOCAL PROBLEMS

Tidewater Oil Company built its $200-million refinery 200 miles farther south rather than modernize its old one in Bayonne, N. J. The local tax rate at the time was too high.

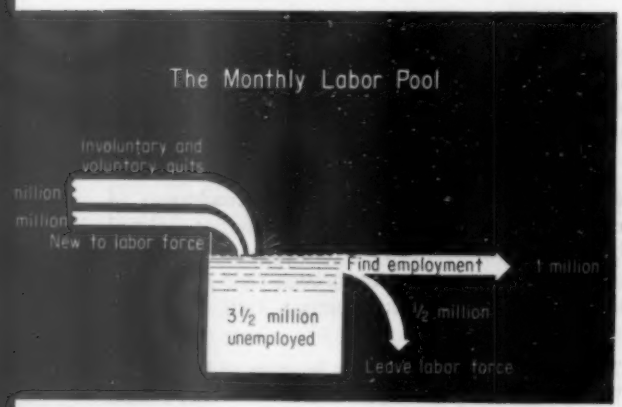
Such problems can be caused—and cured—at a local level. (Esso Oil came to terms with the same government in Bayonne on its tax problem.) But local problems often overlap the national one.

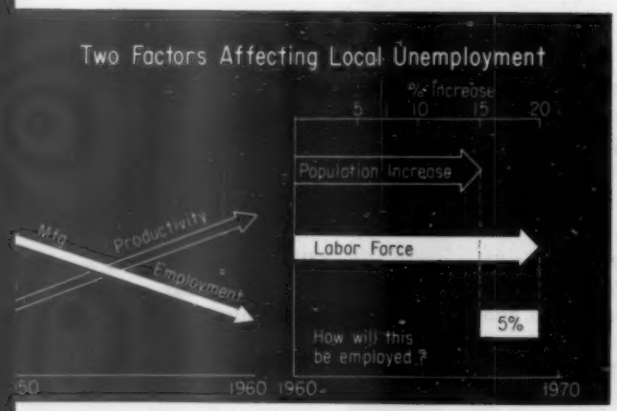
## The national problem lies in our unemployment picture

As the top diagram shows, every month there are 3½-million people out of work. The level of this labor pool fluctuates seasonally. Forces affecting it are many: government action, economic conditions, rising productivity, spiraling wages, even what you do on a local plant basis. You may not fire anyone, but the man you don't hire throws the unemployment ratio out of balance.

At one time last year, 10-million people were looking for jobs. Average for the year was 4-million. True, up to half of these may have been wives looking for temporary work, students seeking summer jobs, and marginal workers. But our concern is with the other 2-million displaced people.

Despite sharp recovery from the recession of 1957-58, the non-working part of our population has remained about 4%.




### MORE GOODS—FEWER WORKERS

If unemployment is the large-scale problem, where does its heart lie? The bottom diagram pinpoints two challenges we're facing. Productivity is increasing, but manufacturing employment is decreasing. More goods are being produced for an expanding population—by a smaller percentage of workers.

If this trend continues, manufacturing employment may follow the pattern of farming: In 1800 75% of the population were required to produce the nation's food. Today only 10% are needed.

Another reason why managers should be concerned with the future is the national outlook on labor for the next 10 years. As the second diagram shows, total population will increase 15%. But the labor force will outstrip it by 20%. What will be the impact of this "excess" 5% (3½-million workers) on your local employment?

This summer has indicated only one of these challenges: a shortage of jobs for summer seekers.

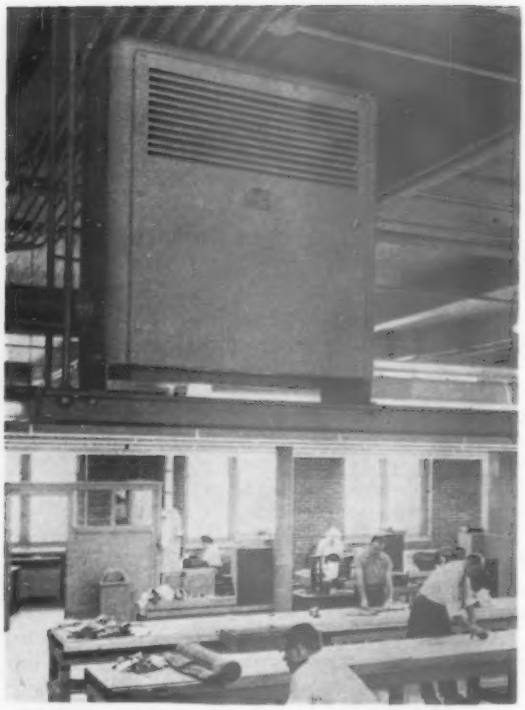
### GROWTH IS ONE ANSWER

To achieve it means increased responsibility for you—and for every member of plant management. Rather than cut employment, you must find ways to expand it that are profitable to management and the economy. Your talents, imagination and energy must be added to those of other men throughout the company—men who are seeking new products, sensible additions to product scope, and expanded markets.

Solid planning is needed. If foreign competition gets rough, complaining won't beat it. If consumer tastes change, new products must be ready. If production costs rise, better methods must be installed. The same goes for inadequate processes, materials.

If, as management claims, economic progress is its product, this is the time to demonstrate it. Labor can do little about expanding company markets, developing new products, installing efficient methods.

These are management prerogatives. And if you refuse to shoulder them, Mike Maynard is right—someone else will.



# Nine ways you can SILENCE transformer hum

Transformer hum control in quiet production and office areas is a growing problem in today's modern plant. Reasons: (1) higher lighting levels call for more transformer power, and (2) managers are becoming more conscious of the disturbing effects of persistent, discordant sound.

Here are nine rules that will keep you out of hum trouble on new transformer installations, and enable you to correct disturbing locations.

By F. J. BRUTT
Distribution Transformer Department
Westinghouse Electric Corporation, Sharon, Pa.

## To silence transformer hum:

**1. Fix transformer locations during design stages of a new plant building, whenever possible.** If you mount transformers in available spaces *after* the building is finished, expensive modification may be needed to correct noise problems.

**2. Install transformers where noise will be least objectionable**—in storerooms or low-occupancy areas, or near other noise-producing equipment. This point seems all too obvious, but it's often overlooked.

**3. Avoid mounting transformers in areas where voices echo.** Stay away from reflecting enclosures or objects that cause resonance. Places like stairwells and hallways can be trouble makers.

**4. Mount transformers in a "free field" away from tile, brick, concrete, or steel ceilings, walls, or floors.** This way you'll avoid sound amplification by reflection. Second-best mounting is a flat surface. A corner mounting is least desirable. Reason: All sound is then concentrated in a single quadrant.

**5. Use vibration damping between the transformer and its mounting.** Some newer units already have this damping built into the core suspension system within the transformer itself.

**6. Use non-rigid conduit or flexible conductors to connect transformers.** Core vibrations not isolated by internal damping can be transmitted to the building structure just as easily through rigid conduit as through the transformer mounting itself.

**7. Don't mount transformers in areas of light mass.** Walls, partitions, balconies, and upper floors should be taboo. If the weight of the mounting surface corresponding to the projected area of the transformer is equal to or greater than the transformer weight, the chance of noise amplification through surface vibration is reduced considerably.

**8. Don't mount transformers on surfaces that could cause distortion of the transformer assembly.** Wherever a surface is obviously uneven, use shims or compressible material (such as neoprene) at the point of mounting.

**9. Wait until your new building is finished and functioning at regular capacity before you take steps to correct hum.** Very often normal industrial noises will mask transformer hum, and make corrective measures unnecessary.

# New organization plan fills manufacturing's 3-way stretch

The concept is simple: to run manufacturing effectively, management must plan, operate, and control.

Our approach is simple: to manage more effectively, the organizational structure must divide these functions.

Making the change to fit this three-way stretch is not so simple. Reason: It takes time. Westinghouse started to put the three-way plan into effect six years ago. It's only about 90% complete now. But time was essential to the plan's success—because by changing gradually we managed to avoid confusion and personnel problems.

Division or department managers planned the changes over a two- to three-year period. In some cases, individual functions may never be combined to conform to the organization structure. But in principle we anticipate that all plants will eventually operate this way. The change has had very little effect on the relative numbers of management employees.

One of the most significant functional changes wrought so far involves our foremen. In our former manufacturing organization structure the foreman had partial responsibility for nearly everything. For example, he was expected to plan and improve layout on the floor, decide what machines to buy, operate processes that often were incompletely developed or had bugs, and solve industrial relation problems—even though he couldn't spend enough time with his employees to know and understand them. In other words, he had responsibility for the performance of functions for which he was not adequately trained and lacked experience. Most important, he did not have time to perform them properly.

Now, we have better labor relations because the foreman can spend more time with his people. He is now primarily responsible only for the performance of the individual operators under his supervision.

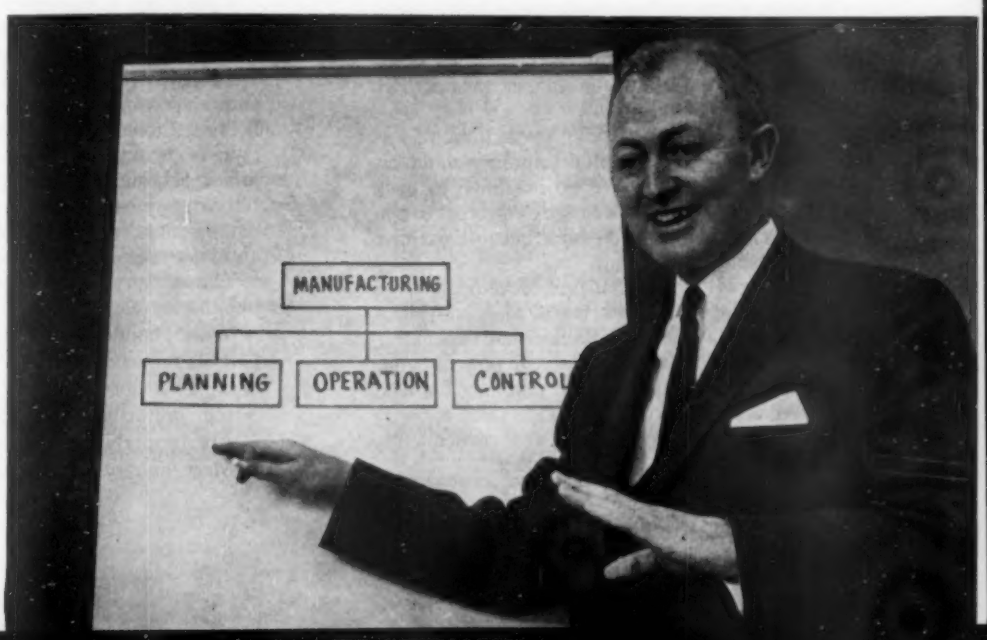
His responsibility for new methods, plant layout, and new equipment is secondary. He now acts more as a consultant than as a participant. As a result, we expect to obtain greater efficiency from the processes we now operate. Also as a result, we expect to be able to tackle and solve more comprehensive modernization programs.

**For a look at how the three-way manufacturing organization works step by step . . .**

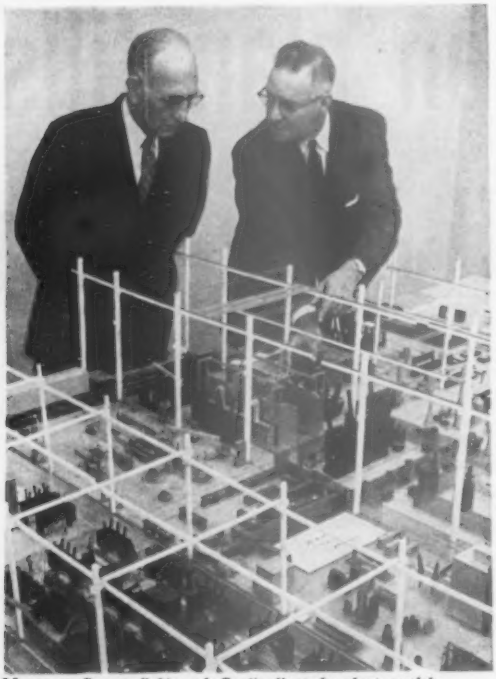
**Turn the page**

By GEORGE JERNSTEDT, Manager of Manufacturing Planning, Westinghouse Electric Corporation, Pittsburgh, Pa.

At right the author shows how the new plan works at Westinghouse plants.



# MANUFACTURING IS . . .



Managers Gavert (left) and Gagliardi study plant model.

## PLANNING . . .

*"Manufacturing planning is a bigger job today than ever before—and it's going to be still bigger tomorrow. More complex methods and facilities are involved and, because of this, planning must be separated from operations." (George Jernstedt)*

At Westinghouse, it's manufacturing planning that develops our methods, tooling, and equipment. This function also plans and carries out their installation in the shop.

With the planning function organized separately, it is now possible to tackle comprehensive replanning jobs to improve the productivity of existing plants and to build in higher productivity planning new plants.

We have specialists working on such matters as numerical control, new metal joining techniques, packaging, and so on. We do not have to back away from big jobs. We can tackle problems that require technically trained people because we have plenty of them on our staff.

The improvements that are developed as a result are combined into a broad plan and introduced so that we get an accumulated benefit.

Ideas that we developed last year now fit better into improvements that we are planning for next year. We are able to produce to the same capacity with less and less floor space and consequently lower investment per unit of product.

Operator Devlin gets on-the-job help from Foreman Philpot (right).

## OPERATIONS . . .

*"Supervision of production workers is a full-time job. The foreman must devote most of his time to it. His job is to meet production schedules and leave the detailed planning of facilities to persons trained and skilled in this work." (E. J. Gagliardi, Manufacturing Manager, Power Circuit Breaker Department, Trafford, Pa.)*

The chief responsibility of operations is the actual manufacture of the product. To the foreman goes the responsibility for all operations for an individual part, subassembly, or small product. And at Westinghouse we carry this principle right on through to the top of the manufacturing organization. For example, we now have quite a few satellite plants where only one product is made and where only the operations part of the organization is permanently established.

Operations management includes, in addition to the foremen, general foremen and superintendents. The foreman is the key man in operations. His work pattern permits him to become acquainted with each worker. His supervisory responsibility is limited to 15 to 25 employees depending on the type of operation. Since the foreman has only minor responsibility for planning new methods, improving methods now in use, or determining new equipment needs, he can devote his full energies to his major responsibility—manufacturing a product.

The primary job of a foreman is to see that all his employees:

- Work continuously for the specified work period, minus reasonable personal time.
- Apply a normal effort.
- Use prescribed methods and facilities.
- Are properly selected and placed.
- Meet quality requirements.

Manufacturing Manager Gagliardi (left) and Foreman Philpot examine plastic tape that controls Milwaukee-Matic metal-cutting machine (background).

# CONTROL

*"The main problem here is to identify the economic value of such things as in-process inventory, quality, and labor performance and then to control the operating departments accordingly." (R. V. Gavert, Manufacturing Director, Apparatus Products Group, E. Pittsburgh)*

The control function at Westinghouse includes quality control, production and inventory control, and industrial engineering.

A word of explanation is probably needed about our approach to industrial engineering: For us, this function is concerned primarily with layout and methods of individual work stations, production standards, and wage payment plans. The development of our manufacturing methods, sometimes included in industrial engineering, is the responsibility of the manufacturing engineers in the manufacturing planning department.

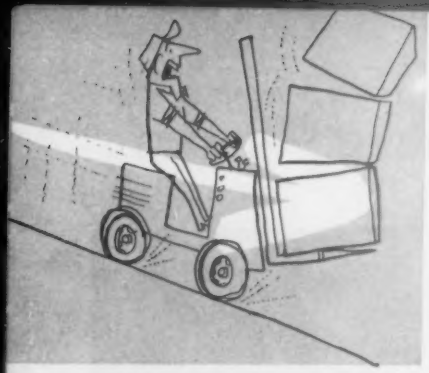
Developing *and* improving controls are generally included within the same control function. However, there is a separation of the *application* of new techniques from the *development* of new techniques. Some control systems are becoming very comprehensive, involving for example, much integrated data processing. For this reason, we have organized a staff function at headquarters whose sole responsibility is to develop and improve these control techniques. Under this new plan, at the operating division location there will be greater emphasis on application, less on development.

By separating these control functions it is now possible to put a direct monetary value on in-process inventory and other intangible costs that can be used to justify new equipment purchases and techniques developed to reduce costs.

The people in each control function do just what the name implies: *They* carry out the control function. In the past we depended on paperwork to carry out the control function.

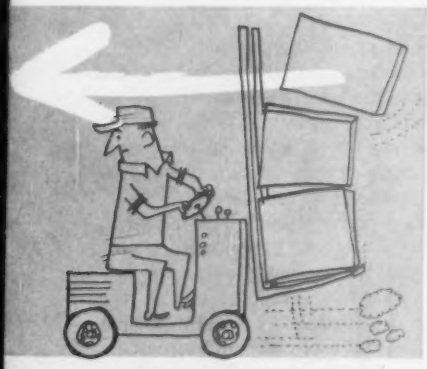
The job of the qualified and specially trained persons in each control function is to see that the function is carried out in the most efficient way—even to the point of eliminating the mechanism by which the control was previously accomplished.

For example, one objective of the control group is the elimination or reduction of paperwork. Recently, we realized this objective in one area. Result: Westinghouse is now applying measured day work to all new operations and has also managed to convert a few older operations. The measured day-work plan absolutely depends on the efficient operation of a well-organized manufacturing controls group. What has this new day-work plan meant? Better labor relations, hourly earnings unaffected by level of performance, less resistance to methods improvement, simpler operations organization, and less paperwork.



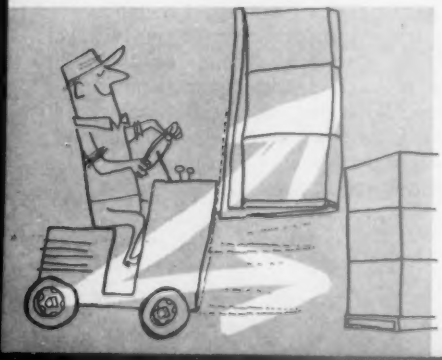
SOLVED: downhill braking

SOLVED: traction problems



SOLVED: rough reversing

NOW—fast drive, fast lift.



# NEW HYDRAULIC TRANSMISSION SOLVES FORK TRUCK PROBLEMS

**This break-through in transmission design will soon be helping your fork lift trucks lick their toughest jobs. It will shortly be available to all truck manufacturers.**

For years, the search for a more versatile transmission for gasoline-powered lift trucks has followed the path of hydraulics. And the major roadblocks to the successful design of a hydrostatic system have been cost and reliability.

These roadblocks at last appear to have been removed by the New York Air Brake Company, Watertown, N.Y., by the design of an industrial hydrostatic transmission for off-the-road motor vehicles. Because a hydrostatic system permits the engine to deliver maximum torque to the drive wheels at very low engine speeds, a lift truck may now do with ease the tough tasks pictured at the left.

Installed in a standard model 4000-lb. lift truck (furnished by Yale & Towne Manufacturing Company, Philadelphia), a prototype of this new transmission performed remarkable feats at a demonstration for FACTORY editors last month in Watertown, N.Y. Here's what our editors saw:

- The truck rolled a 1500-lb. load up a 15-deg. slope while the engine was idling. Then, with the engine in reverse, it brought the load slowly (and under full control) down the ramp without mechanical braking.
- The same hard-tired lift truck, without load, crept smoothly onto a 5-in.-deep bed of foundry sand without slipping. It maneuvered at will and then worked its way out without bogging down.
- With 1500 pounds on its forks (and at top speed), the truck shot into reverse, then up to top speed again without dumping the load.
- At full forward speed and with 3000 pounds on the forks at floor level, the truck boosted the load to high position.

It all looked incredible. But to transmission specialists, these feats have been predicted for hydrostatic systems for years. Accelerated research for the U.S. missile program has speeded development.

A Yale & Towne spokesman predicts his company will make the new transmissions available to customers within 12 to 18 months. New York Air Brake estimates that the cost of the transmission (which it plans to produce in quantity and to market to all manufacturers of mobile industrial equipment) will be competitive with mechanical and torque-converter drives.

Hydrostatic transmission is characterized by the ability to deliver just the right amount of energy to the drive mechanism without destroying it—spinning the wheels, for instance. It can transmit energy to as well as from the engine—dynamic braking. And it can exert its maximum pressure regardless of the speed of the engines.

Hydrostatic transmission can be achieved by several design approaches. The New York Air Brake Dynapower system consists of two units: (1) a variable displacement hydraulic pump of the axial-piston type, coupled directly to the driveshaft of the engine, and (2) a fixed displacement hydraulic motor that is coupled to the differential of the lift truck.

A hydrostatic transmission, according to New York Air Brake, needs no preventive maintenance other than a daily check of oil level and occasional changing of filters. Besides yielding better performance on tough jobs, lift trucks that are equipped with hydrostatic transmission systems give longer tire life, need fewer replacements of brake linings, and, of course, have no clutches to worry about.

Because controls will be simplified, operator fatigue will be lessened, and even the inexperienced operator will have a chance to perform more efficiently. Greater maneuverability should provide a better utilization of floor space, assuming the individual plant set-up allows for a narrowing of the aisles.

# A *FACTORY* ENGINEERING AND TECHNOLOGY REPORT

# NOISE CONTROL

## NO. 7

NOISE NOISE NOISE

To understand how noise is transmitted, consider this situation: A clerk sits in an office in the corner of a shop where a punch press is operating. The noise may travel from press to clerk by a number of paths: (1) It may be transmitted directly through the air; (2) it may radiate from the press to the walls, forcing them into minute vibrations; (3) it may come from the floor, which has picked up some of the vibrational energy directly from the frame of the press.

While a few installations have near-insurmountable noise problems that can be solved only by expensive equipment or process changes, most plants can appreciably cut noise with a reasonable expenditure of time and money. The simple, inexpensive approach was recommended recently by a top acoustical consultant as the logical first step to any noise control program. Surprisingly often, it's the only step needed. Here's how to get started . . .

First of all, remember there are three ways you can fight noise. In order of their effectiveness, these are:

### 1. Control at the source

**Slight modifications of an operation can often reduce the seemingly unavoidable noise in such operations as sawing, punching, tumbling.**

### 2. Control of noise transmission

**Barriers, baffles, enclosures, and other acoustical treatment of work areas can isolate a noise source from its surroundings.**

### 3. Control by personal protection

**Earplugs, muffs, or helmets can adequately protect workers when it is impossible or impractical to reduce harmful noise.**

## 1. Control at the source

This is the most logical as well as the most effective place to combat noise, because here, noise *control* often means noise *elimination*. There is no fixed set of rules and there are no handbook solutions. But ingenuity and a plant-wide realization of the problem can work wonders. Noise control goes hand in hand with good maintenance. More than one plant engineer has found that a noise control measure (e.g., quieting a set of gears) has given side benefits (such as longer machine life) that are as important as the original objectives. And this happens in highly maintenance-conscious plants, too.

Noise is the undesirable companion of most automatic production machinery and high-speed material handling systems, so a considerable amount of your efforts will be concentrated there. If you're expanding or modifying in either category, remember that noise is easier to *prevent* than *eliminate*. Put a quiet operation in your list of goals for the new set-up.

Here are some common noisemakers along with suggestions for making them less offensive. It's not an all-inclusive checklist, but *does* offer a place to start for almost any plant.

- Small parts rattling down chutes and into hoppers will be considerably less noisy if the chute or receptacle is lined with a fibrous material (felt, paper, asbestos) and covered by a layer of sheet metal. The sandwich construction protects the damping material from erosion, lowers the friction between the parts and the damped surface. Adding an acoustically treated top to the chute or receptacle further reduces noise. This type of construction can also be used on oscillating conveyors.

- Air-operated tools, major offenders in many plants, are often easy noisemakers to silence. There is a growing number of suppliers who offer mufflers for these tools. One maker offers a standard silencer in sizes to fit all port openings from 1 to 30



NOISE

inches. Another has zip-on muffle covers: sound-absorbent overcoats that cut jackhammer and air drill noise by a big margin. On the other hand, some companies prefer to design their own, find that an inexpensive "tin can" type of muffler, filled with coarse steel wool, will solve their problem.

- Automatic screw machines produce several noises, one of which is generated as bar stock is pulled through feed tubes. This can be reduced by inserting coil springs inside the tubes, wrapping the outside with the material normally used to keep water pipes from sweating.

- High-volume air exhaust roaring can be effectively reduced by coating the inside of the ducting with asphalt, fiber glass, or other resilient material. Sometimes the ductwork itself is vibrating and must be reinforced to eliminate the noise.

- Punch presses can be quieted somewhat by giving attention to the design of the punch. If it is made with a slight face rake so one edge strikes the work ahead of the others, it produces a shearing action rather than straight punching. When multiple punches are used, plan to have them enter the work progressively, if possible, rather than all at once. This will further cut noise.

- Air jets contribute noise in two ways: (1) the velocity of the air; (2) the air flow across sharp edges or irregular surfaces. Adjusting the set-up to give a smooth air path will eliminate the second. The first can be quieted by re-designing the nozzle. If the jet is aimed at a large surface (as in air blow-off or air-drying), a multiple-opening nozzle provides sufficient cleaning or drying at greatly reduced noise levels. One such nozzle, developed at the noise laboratories of Liberty Mutual Insurance Company, replaces one $\frac{3}{16}$-in. opening with five $\frac{1}{16}$-in. openings in the end of a chamber on a standard pipe fitting. For air ejection operations, Liberty Mutual studies find that the best compromise between noise level and effectiveness resulted from a multiple-opening nozzle operating at a low line pressure and placed close to the part being ejected.

- Circular saw blades used in wood-cutting operations produce a high-frequency resonance that can be reduced by a metal stiffener mounted next to the blade. The stiffener should be as large in diameter as the depth of the cut permits.

- Sheet metal protective covers over belts, gears, or other moving machine parts often act as sounding boards for low-frequency noise set up by the machine itself. This can be prevented by the substitution of metal mesh screen in place of the sheet metal to reduce the vibrating surfaces.

- Gear drives are often noisier than they need to be. Spur gears—which are probably the noisiest type—can be quieted by substituting pinions made of nylon or other synthetic material. Substitution of herringbone or worm gears will also help. So will encasement in a fibrous or synthetic material gear box.

- Paging systems can be a source of irritation, especially in a noisy plant, since they must be clearly audible above the loudest sounds in the shop. Newer systems use individual receivers, are less distracting. Some plants have devised paging systems based on flashing lights or other visual signals.

# 2. Control of noise transmission

Interference with the *path* that noise follows from source to receiver is the second most effective place to control unwanted sound. The great number of sound-absorption and vibration isolation materials on the market are designed to do this. All too often, though, these materials are improperly used and the user feels he has been misled about their effectiveness. Injudiciously slapping on acoustic wall tile, for instance, seldom does much to reduce unwanted sound. First step to a workable method of blocking the noise transmission path is to be certain of the *source* and just *how* the noise is transmitted. Also, it is important to match the material with the kind of noise you're trying to control.

Here are some of the methods commonly used to block the path of noise. Properly applied, any one of them could be a starting point for your program.

- Vibration isolators under machine bases are probably the best known of the noise reduction materials. They effectively break the transmission path from machine to floor, especially on upper-floor installations, since cast floor-ceiling slabs make remarkably good transmission paths for solid-borne vibration. Surprisingly often, these isolators are improperly used and hence fail to serve their purpose. A machine is sometimes mounted on a pad and also bolted *directly to* the floor. This, of course, defeats the purpose of isolation, may even create a condition worse than having no vibration isolators at all.

- Local isolators, within machine tools themselves, can halt noise produced in the machine that would normally be transmitted through gears, bearings, and the like, to the frame. Fiber gears or soft metal bushings on rotating shafts are often effective in this manner. So are belt drives and isolating shaft couplings. As in the case above, avoid "short circuiting" the isolators with mounting screws, rigid conduit, or sheet metal ducts. Hoods, panels, or sheet metal covers on the machine may actually act as sounding boards if they are rigidly attached to a vibration source. This can usually be prevented by clamping or coating with a deadening material.

- Partial enclosures made of sound-absorptive material are often useful in separating adjacent noisy operations (such as a series of air grinding stations). Individual operators are protected from the over-all noise level, although not from the noise of their own machines. This treatment can be effective where there are intermittent operations; a worker gets relief from the noise any time his own machine isn't running. It's commonly used on multi-station lines.

- Total enclosures, properly designed, are highly effective in reducing single-source noises. They're especially effective on automatic equipment, large motors, wood planers, cutters, and the like. Openings in the enclosure must be designed with care since they allow more air-borne transmission than their relative size indicates. It's not always necessary to have a sealed opening, however; sometimes noise-trapping baffles will work. The enclosure should be lined with acoustical material that absorbs sound over the desired frequency range to prevent the build-up of internal noise energy. Sometimes only a small section of the machine needs to be enclosed. One easy method of checking: Cover the section with a shallow wooden box, padded at the edges for a good seal. If this reduces noise, it's worth spending the time and money to design a proper, more effective cover.

*Turn the page*

- Sound-absorption treatment of walls and ceilings is probably the most common noise control measure. But indiscriminate covering of just any surface is certain to prove disappointing. Offices are popular places to receive acoustical wall and ceiling treatment, but if your problem is caused by solid-borne noise transmission (as through thin partitions), the noise difference before and after acoustical treatment may be barely measurable.

  **To make sure you get results from sound-absorptive surfaces, remember that these two conditions must exist for treatment to be effective:**

  **1. The room must have little sound-absorbing material in it before treatment. That is, it must be reverberant.**

  **2. The noise must come from multiple sources, with no one source producing the major portion.**

  Also, it is unrealistic to expect a 20-30 db reduction by the use of absorption materials alone, as some plants have attempted. Usually, a 7-10 db reduction is the maximum that can be achieved this way. If overhead pipe, ducting, girders, etc., tend to make ceiling coverings impractical, hanging baffles will achieve a similar result.

# 3. Control by personal protection

Ear plugs, ear muffs, and helmets can all offer suitable protection for the employee who *must* work in surroundings with high noise levels. The one big drawback of these protective devices is that they have never gained widespread worker acceptance. Men who unquestionably accept the need for safety glasses or hard hats will often flatly refuse ear protection—or will fail to use it properly. The reasons: myth, misunderstanding, misinformation. And there's the fact that hearing loss is usually so gradual that it's unnoticeable to the employee. This makes him skeptical about noise-caused hearing impairment, which creates a vicious circle: Increasing impairment means decreasing irritation to the worker.

Most of the available devices, properly used, provide 10-20 db attenuation below 1000 cps and 35-45 db above 1000 cps. If earplugs are used, they should be individually fitted by a nurse or medical technician, because a loose plug is worse than none at all. Even under the best of conditions, the maximum attenuation possible is usually about 50 db, since extremely loud noises are transmitted not only through the ear canal, but also through skeletal bones and body cavities. Below are some helpful facts about all these devices:

- Earplugs on the market today are lightweight, comfortable, easy to clean and effective. You can tell your workers with confidence that there are no physical complications directly attributable to wearing ear protectors. And the old fear that earplugs make it difficult to hear speech and warning signals has been disproved. In fact, speech and normal danger signals can be heard *better* when plugs are worn in continuous high level noise. A number of different models allows a wide range of choice, offers plugs designed for protection at specific frequencies.

- Earmuffs offer most of the advantages of plugs, except light weight. They have the further advantage in that they need not be individually fitted—one size fits almost everyone. New designs are being developed and one current model has fluid-filled circumferential padding to provide a tight, yet comfortable seal around the outer ear. Other models have built-in earphones.

- Helmets are usually chosen to serve multiple purposes, not just for ear protection. Some helmets provide an enclosed support for earphones, others offer protection against crash or wind blast. As with all protective devices, the selection depends on your operating conditions. Often, safety equipment manufacturers can offer helpful advice.

# Seven sound pointers

If you're not winning the noise battle on your own, you may need outside help. There is lots of research being conducted by universities, professional societies, medical centers, and insurance companies. Admittedly, much of this is directed at the problems of screaming jet aircraft, but some of the answers apply to industrial noise, too. The universities may be willing to tackle your problem—for a fee, of course—and the insurance labs are available to policyholders. There are several qualified consultants in the field. Any one of these can help.

Don't concentrate all your efforts on one or two operations—or one or two techniques. Fight noise all over the plant, with any (or all) of the appropriate methods available. There's no general rule as to where or how to start, except the obvious one that says to begin with the loudest noise first. (If two noise levels differ by 10 db, there is practically no contribution to the over-all level by the quieter of the two.)

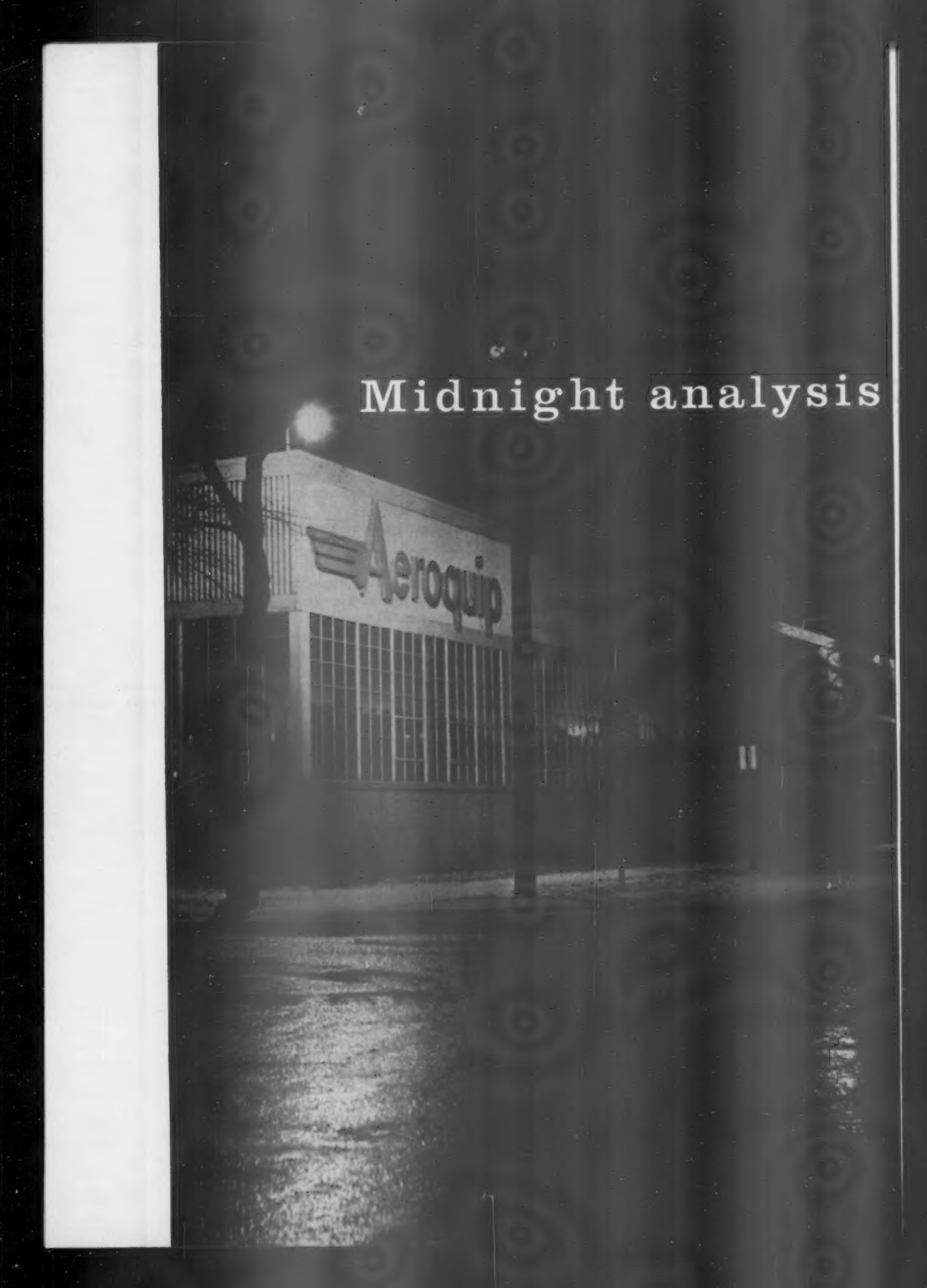
Equipment and accessory builders are giving increasing attention to noise control products—and so are materials producers. There's a growing selection of mounts, baffles, isolators, balancers, sound-absorbing panels, vibration analyzers, earplugs, protective helmets. Prefabricated enclosures are available, too. One company cuts noise 60% with a cabinet over the card-processing section of an IBM Keypunch.

Remember that adequate planning could have prevented many of your noise problems, so don't make the mistake of ignoring it next time. As you draw up specifications for a new wing or building, select a new machine tool, or install a fabricating system, check it for noise. Architects, tool designers, and systems engineers are all growing increasingly aware of noise. Keep them that way.

Liability for impairment of hearing is difficult to prove conclusively since sound is everywhere and it is almost impossible to find which exposure, if any, has caused the loss. This is complicated by the fact that, with age, there is a normal decline in hearing ability. To provide a reference for judging any changes in employees' hearing, many companies are now including audiometric tests in their physical examination programs. Periodic rechecking and comparison of results help spot a loss early, very often before the employee himself is aware of it, since impairment usually starts in the frequency range above normal speech and conversation. So if you have an inherently noisy operation, audiometric tests are an important part of your hearing conservation program.

Don't turn the noise problem over to a safety committee and forget about it. By the same token, employee hearing problems aren't the exclusive concern of the medical department. An integrated, plant-wide program is needed to cut noise substantially and to assure protection against hearing loss.

It's time for employee education about noise. There's still widespread ignorance as to the possible harm it can do. And there's a reluctance to accept hearing protective devices. Add to this the fact that noise is often considered "inevitable" in a plant. It's not difficult to see why there is considerable indifference to noise control programs. If you tell the people on the job *what* you are doing and *why*, you may be surprised at the ingenious ways they will find to help. But all this will take more than just a notice tacked onto the bulletin board. So plan your noise campaign as carefully as you would a safety program.


Midnight analysis
Aeroquip

First thing every morning, production managers at Aeroquip's quartet of scattered plants receive the latest inventory reports citing plant needs.

## gives these managers

# OVERNIGHT INVENTORY CONTROL

Until recently, Aeroquip Corporation (Jackson, Mich.) had a fairly typical multi-plant operation.

But today its four widely separated plants are linked to a central control location, where inventory records for each plant are electronically updated in the dead of each night.

Production managers have an up-to-date report on their desks every morning. And it contains only the exception items that need attention. Under the new system, inventory has been slashed and customers get better service. Inter-plant shipments have reached $5-million worth of components per year. Clerical savings are substantial, but are dwarfed by the value gained through more efficient operation. Information is more accurate, more complete—yet less voluminous. And it's on time.

Before installing the overnight central control, each plant had its own system for manually posting inventory data to large cards—one for each of 30,000 stocked items. Posting clerks were expected to note when the supply of an item dropped below the reorder point. There was no provision to expedite checking and no way to study stock levels at other plants, except by phoning. The whole operation was slow, cumbersome, inaccurate, and costly. Human errors crept in. Stock-outs occurred. Conversely, some items were overstocked.

The new operation is on completely different lines: During the day, operators at each plant punch cards for all transactions affecting inventory—receipts, disbursements, requisitions, etc. In the evening, the data are sent to an IBM Ramac computer in Jackson. The cards—representing some 7000 transactions daily—are hand-carried from the two Jackson plants, and sent over leased telephone wires by a Transceiver system from plants in Van Wert, Ohio, and in Burbank, Calif. During the night, the computer updates complete records for all items stocked at each plant —usage, future requirements, open orders, balances.

At 6 a.m., the information is sent back to the plants, where the new cards become working documents. Daily exception notices in card form boast a red stripe that glares at managers until the situation is corrected. Then the computer can knock out a normal card on the next cycle. Printed reports only contain exceptions and the data needed to correct them. For example, if a delivery is scheduled to arrive *after* normal usage will cause a stock-out, the report shows how late it will be and which vendor to push. Overstocked items are caught monthly. Monthly reports are also made on requirements, on overdue purchase orders, and on receipt commitments four months in advance.

Total cost: less than decentralized operations.

At end of production day, data transceiver operator (below, left) at cross-country plants inserts punched cards into long-distance transmission system. During the night, central control (right) processes data, returns information for morning reports.

# THE CASE OF THE MISSING METERS

An Editorial Commentary

**BY GERALD C. QUINN**
**ELECTRICAL EDITOR, FACTORY**

**Graduate EE, 18 years' experience in industry. Currently active on five AIEE committees. Member AIPE.**


**Why do so many plants have power systems that are inadequate, overloaded, obsolete, poorly planned?**

Top management isn't interested, there's no pressure to modernize, other projects take priority, haven't time for planning, there's no room in the budget—there are almost as many different answers as there are plants.

But, there's one reason that underlies all others.

Most of the time managements don't have accurate up-to-date facts about their power systems. **Unquestionably, they don't have enough instruments.** In FACTORY's 1958 electrical survey (August issue), over half of the 359 plants reporting said they didn't have enough metering to keep track of load growth or costs.

Why are meters so important? Because you don't measure power by adding up columns of figures. You do it with meters.

Only meters can tell you which feeders are overloaded—and at what time of the day or month; how fast loads are growing; where spare capacity is; what loads are causing poor power factor, voltage swings, demand penalty charges. Only with meters can you know whether your machine tools, lights, or infra-red ovens are getting the right voltage to give long life and optimum performance. You really can't *manage* without meters—but many plants try to.

Skimping on electrical instruments is no monopoly of old plants. Walk through brand-new plants and you'll see one load center substation after another with a lonesome voltmeter, perhaps an ammeter on the secondary bus. You'll find no watt-hour meters, no recording instruments, no instruments at all on individual feeders.

Why put meters on individual feeders? Under normal one-shift operation, a typical 480-volt breaker in a unit sub will handle $250,000 worth of power. Shouldn't it be worth ⅒ of 1% of this to know how much the load is, what the department or machine that it supplies should be charged for power during those 25 years? The principle applies even more clearly to high-voltage feeders at the main substation where power to each feeder ought to be metered.

**Whose fault is this paucity of instruments?** The blame falls on many sources—plant management, equipment builders, engineering consultants, meter manufacturers, electrical engineering groups.

- Plant management fails to recognize that without accurate electrical data on a continuous basis you can't really manage power.
- Equipment makers share the blame. Far too often they enter a low bid on an inadequately metered substation rather than lose the job.
- Consulting engineers, who should guide management in the importance of adequate electrical data, admit meters are the first item they drop when they're asked "Can't you cut the cost?"
- Meter manufacturers have often been less than aggressive in driving home the importance of their equipment.
- Engineering groups have failed to specify what adequate industrial metering is. They have failed to make their standards flexible enough for lighter-duty, lower-priced panel-type instruments where the ruggedness of switchboard quality meters isn't necessary. (Yet these panel instruments have been used on control equipment for years.)

**What's the cure?** Perhaps we could wait for solid-state devices to give us bargain-priced digital, remote read-out instruments some day. Or wait for manufacturers to come up with an answer. Smart plant electrical engineers aren't waiting for anybody else. They're adapting add-on meters to existing equipment. They're insisting on adequate metering on new substations. They're making best use of portable instruments. And they're giving management month-by-month analyses of power costs, trends, load changes. They're showing the kind of savings only a properly managed power system can produce.

EXCLUSIVE

Robert B. Wilson (left), former consultant to European Productivity Agency, warns plant men:

# U. S. MAINTENANCE IS NEXT TARGET FOR FOREIGN COMPETITION

Within 10 years, maintenance in free Europe will be as advanced as in the United States, reports this much-traveled management expert. And in these plants workers are being paid at a fraction of the going U.S. rates for the same work. Prediction: a terrific competitive struggle for world markets with a West European manufacturing complex in

LONDON: WORK MEASUREMENT ABSOLUTELY BASIC HERE....PARIS: LABOR RELATIONS IN FRANCE COM-

which their technology and maintenance management stand ready to challenge ours at every step of the way. And, contrary to the situation here, wages will probably remain low as their technological know-how advances. To counter the challenge, the U.S. must seek an entirely new approach, integrating production and maintenance operations.

*Turn the page*

## FOREIGN MAINTENANCE

Just a few months ago, FACTORY reported the status of industrial maintenance in Russia and its satellite countries (February 1960, page 62). The conclusion: The U. S. A. is ahead and because of free competition it will always be ahead.

But what of maintenance in the free countries of Western Europe? Where free nations possess technological talents and inventive genius paralleling our own. Where manufacturing plants—although admittedly fewer—equal the best of ours in design and facilities. Has European industry progressed as well as ours in management of the maintenance function? Can we learn anything that will sharpen our cost-cutting blade?

For the answers we turned to Robert B. Wilson, just recently returned from a 14-month survey of European industry in his capacity of maintenance consultant to the European Productivity Agency. FACTORY's questions appear in italics.

*What is the average level of maintenance in Europe compared with the U.S.A.?*

In general, U.S. companies are doing a better job of maintenance, if measured by per cent of fulfillment of operating schedule. But local conditions affect the maintenance picture in the various European countries. The individual maintenance man in Western Germany, for example, displays a very high standard of craftsmanship, sometimes permitting a plant to get by with less of a maintenance "organization." In Italy, on the other hand, labor is cheap, and the size of the maintenance force is only now beginning to be an important factor. Companies in the U.S.A. have had much higher financial stakes in their factories, and consequently have paid more attention to getting maintenance well organized.

*What do they do better than the U.S.A.?*

About the only element I could find that showed clear superiority over all countries was the apprentice training of maintenance mechanics. Because of the social situation in most European countries it has been the prevailing custom for boys to enter apprentice schools at age 14. This produces a highly skilled mechanic in the end—widely experienced and resourceful.

*What are the chief maintenance headaches or faults in European plants?*

Maintenance headaches are much the same the world over—breakdowns, parts shortages, pressure to cut costs. Europeans have them just as we do. However, they have some headaches we don't, originating in historical background, social mores, and governmental structure of each country, all of which affect maintenance as well as other plant activities. (For example, in Italy, because of the highly critical employment and earnings situation, you can't lay off part of your force without government approval.) Europe has its special headaches in getting spare parts and engineering information. There is also a scarcity of mediums for exchange of information. I met many maintenance men carrying on with antiquated production and maintenance equipment because they were not aware anything better was available.

*What do we do better in plant maintenance?*

Our industries have been forced, by demands of expansion and high labor costs, to dig into the general management of maintenance in all its facets to a far greater extent than is generally true in Europe. Not the least by-product from this is the growing interest of top management in maintenance. We have much better organization of peripheral areas like engineering of plant improvements, economic studies for new equipment, records of equipment maintenance costs, and supervisory training. But we are no longer unique here. Europe will catch up to us in maintenance techniques and methods within 10 years.

*How well have European plants grasped the concept of managed maintenance?*

Most of them have not come nearly as far in this respect as U.S. plants have been forced to do. I think our developments grew out of our climate of industrial expansion and high labor costs. These influences are only now becoming significant in Europe.

*Do the age and type of European buildings and equipment create any special maintenance problems?*

While a maximum of 25% of European plants are modern by our standards, and others are now in the throes of modernization, the bulk of them are antiquated. As a result, many of them have what to us would seem appalling problems of maintenance. Sometimes, though, they work out ingenious practical schemes for keeping old equipment going.

*How does European maintenance stack up as related to organization, status, type of supervision, type of worker, and so on?*

To answer this, let's consider the average European program, pointing out those features that often differ from our best practices. For example:

- Maintenance is 'way down the scale in status, almost out of sight.
- All the heavy thinking on equipment and maintenance practices is being done by the plant engineering department. And this is strictly white collar and ivory tower.
- Such matters as time standards and work planning are handled in an office separate from maintenance.
- Direct worker supervision is by an older worker promoted to the post after many years. He is not expected to plan, organize, or lead, but only to look after details of workmanship. His crew is far larger than our foremen are expected to cover.
- Workers range from apprentices to old hands.
- Good records of maintenance history, costs, and work loads are lacking, as are definite plans for annual shutdowns and other major projects.

ARABLE TO SITUATION IN USA....FRANKFURT: WEST GERMAN MAINTENANCE MEN DISPLAY VERY HIGH STANDARD C

*Do European plants aim maintenance to keep equipment operating regardless of age, or do they consider the economics of modernization.*

Historically, the tendency has been to keep the old plants operating. In my seminars I always emphasized the economics angle. But most of the maintenance chiefs didn't know what I was talking about, or at least didn't react to it. To them, such decisions were made in a remote, omnipotent office, for reasons completely obscure.

*To what extent do European plants practice preventive maintenance? Corrective maintenance?*

Preventive maintenance is not common in Europe, except for Germany, Sweden, and England. The well-known German penchant for organization has produced some extremely elaborate and complete systems. And England and Sweden are so closely in touch with us their systems are basically the same.

As regards corrective maintenance, the larger companies of these three countries give it about the same attention—still too little—as in the U.S.A. In other countries, it gets much less attention.

*Is there any shortage of skilled craft labor?*

This is a real toughie. Western Germany has expanded its economy at such a rate there is now a general demand for labor. However, I don't think it can or will abandon overnight its traditions of apprentice and mechanic training. Plants seem more and more to be substituting technical advances for skilled labor, just as we have done.

Elsewhere in Europe it's not so easy to say. The surfeit of workers all over Europe continues to encourage the long time spent learning a trade and becoming a skilled worker. So as yet there is still promise of a plentiful reservoir of skilled workers. True, technical advances are creating problems. I was told in every country about the difficulty of getting electronics and instrument maintenance men.

In assessing the future, we have to recognize one important thing—the difference in mental climate between the American and European worker. The vast majority of U.S.A. workers have grown up in what we call the American tradition—you can be President if you just work hard enough and have the brains and energy. European workers, however, tend to regard themselves as holding only a certain station, and think they should not aspire to more. This has provided a certain stability and loyalty to the European worker's attitude that has operated as a hidden benefit for European companies.

*Do European plants encounter any labor or industrial relations problems not common to the U.S.A.?*

This is one of the most pervasive differences between running plants in Europe and in the U.S.A. In Italy "labor relations" is practically a government matter. Unions are national unions along craft lines, and every company runs the risk of bringing on a national strike if it does not follow the prescribed rules. The fact that there can be no layoffs without government approval is one example. In effect this fixes employment in every company. Obviously, such a stricture alters what we are accustomed to think of as labor relations. The situation exists because of the extremely low wage scale—barely enough for subsistence—and the frighteningly high percentage of Communists. The danger is that layoffs could swell the ranks of the Communists enough for them to gain a power advantage.

In Sweden, at the other end of the scale, there has been for many years a national bargaining set-up that has succeeded in avoiding strikes while not limiting productivity. Aided by neutrality in two world wars, the Swedes have the highest standard of living in

## ROBERT W. WILSON: AUTHORITY

**Author Robert B. Wilson is a senior associate of Cresap, McCormick and Paget, well-known firm of management consultants with main offices in New York City. Recently he returned from a 14-month stint in Western Europe as a special maintenance consultant to the European Productivity Agency, an international agency with headquarters in Paris.**

**Mr. Wilson spent an average of a month in each of 11 major industrial countries—England, Ireland, Norway, Sweden, Denmark, Belgium, Western Germany, France, Austria, Italy, and Spain. He delivered formal lectures on maintenance management at various national and local engineering conferences and acted as discussion leader of seminars for about 1000 European maintenance engineers in groups of 25. These activities were augmented by consulting and demonstration visits to over 75 plants, large or small, and covering many types of industries in all 11 countries.**

**Mr. Wilson's qualifications for such an assignment are numerous and impressive. He is a graduate engineer (Drexel Institute of Technology). His early business experience involved design engineering, production control, and inventory control. His knowledge of maintenance management was first acquired when he served as an Air Force maintenance officer. Later he acted as maintenance planning supervisor with American Airlines, where he was responsible for the development of standards, planning systems, and budgets for maintenance.**

**Since 1950, Mr. Wilson has been in the consulting field where he has concentrated on maintenance and engineering studies, including plant layout studies for jet aircraft maintenance and overhaul.**

**With this strong background of many years' practice in maintenance management techniques, combined with the fresh experience of his European assignment, FACTORY would have been hard pressed to find anyone better qualified to evaluate the status of industrial maintenance in Europe as compared with that in the United States.**

AFTSMANSHIP....ROME: LABOR CHEAP IN ITALY -- SIZE OF MAINTENANCE FORCE JUST BEGINNING TO BE IMPOR

Europe, and in general are more like us than any other group. Labor relations in the other countries are more comparable to the situation in the U.S.A.

*Is maintenance better in American-owned-and-managed European plants than in indigenous plants?*

In England, Sweden, and Western Germany, native-owned plants compare favorably with American-owned. There is more interchange of information among these countries, and between them and U.S.A. sources. In other countries, native plants are not as well managed.

*Do European plants conduct any training programs for maintenance supervision or workers?*

Lack of supervisory training is one of the greatest shortcomings in European maintenance management. Our outlook in the U.S.A. on the position of a supervisor is quite different from the European. There, the social system is such that a supervisor (foreman) is not expected to think for himself or accept responsibility. He is told what to do and merely carries out orders. He is not expected to question orders and, generally, would not think of doing so.

*To what extent do European plants use any form of maintenance work measurement?*

Work measurement is surprisingly popular among European companies, especially when the management decides to "go modern." However, it's too often viewed as the magic element that will overcome any defects in planning and work controls.

In England especially, and to some extent in most other European countries, work measurement is now regarded as absolutely basic. This philosophy is being applied to maintenance as well as to production. My opinion is that many European work measurement systems are holdovers from a paternalistic, or even feudal system. They are bound for trouble, when tested either by competition or by a recession, if the workers insist upon a hearing.

*Is higher mechanization or automation creating any maintenance problems in Europe?*

Real advances in mechanization and automation are being carried out by leading European companies. They are experiencing the same problems here as we



are—the need to train workers in care of new equipment, the lack of operating experience to guide maintenance schedules, and the need for close collaboration with production people to minimize downtime.

*Do European maintenance engineers consider themselves adequately equipped in shops, machine tools, and working equipment?*

European plants generally have larger and more complete shops than United States companies, because they do not have parts-supply and communications set-ups such as ours. If Europe continues to integrate its industry through the Common Market and Free Trade Area, more centralized sources of supply will undoubtedly develop over a period of time. Certainly, there is much room for labor-saving equipment in Europe as a whole, but the stimulus to acquire it does not now exist, since labor is plentiful. One of the biggest problems of Europe is to modernize in order to be competitive, yet find employment for all the resultant technologically unemployed.

*How are European plants organized to handle maintenance emergencies or major outages?*

There is a greater tendency in Europe than in the U.S.A. to have men on standby at trouble spots. And European plants are prone to provide many more dual or standby installations. They also carry a bigger stock of spare parts and equipment. All this may be understandable in the light of my previous comments about relative geographical isolation and poor communications with machine makers.

*What literature is available on maintenance management to European plants?*

I would sum this up by saying there is no parallel to FACTORY magazine in any language in Europe. In a few instances I found people translating and paraphrasing American publications for the benefit of their colleagues. There is a vast need for published material of all kinds, and for meetings among European maintenance engineers.

*What is the single biggest need of European industry maintenance-wise?*

Top management awareness of the importance of maintenance, beginning with proper recognition of maintenance needs in the plant engineering function, is the prime need. In other words, what maintenance lacks most today in Europe is the comprehension by management of the possible benefits from a managed maintenance program. It needs to recognize the elements involved in improving maintenance, and to realize that the balanced program necessary to achieve low-cost maintenance takes a period of years.

*In view of your conviction that European plants will overtake U.S.A. plants in their present maintenance practices within 10 years, can you suggest any way we can keep the lead in this function?*

Yes, and it calls for a revolution in top management thinking on the status of the maintenance function. With a few exceptions, we too have been bound by tradition—the tradition that maintenance is off in a corner by itself, that it's basically a negative contribution to profits and an overhead expense to be kept at a minimum. The increasing mechanization of U.S.A. industry and the so-called automated plant could well demand a radical change in our concept of conventional plant organization and relationships that were "good enough" even a decade ago. This would call for an integrated organization in which the distinction between maintenance and production disappears. Thus, maintenance costs would no longer be weighed by their bare dollar amount but by their effect on manufacturing costs. Maintenance will become the really important operation function as production becomes more and more automatic.

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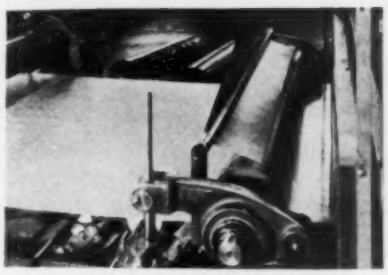

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# Tube ships liquids or solids

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If you're shipping diversified products, chances are your containers are loaded on the outgoing trip, empty on return. You may also have to stock special containers to transport liquid and bulk materials. All this means high container inventories, extra shipping costs.

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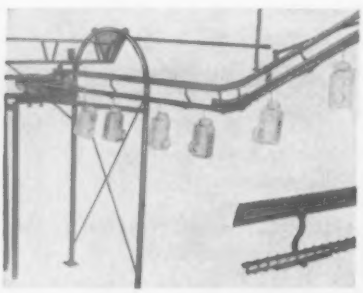
**91—Electric Drum Heater,** in 2½-in. flexible band, wraps around 21½- to 23½-in.-dia. steel drums. For use singly or in multiples, depending on heat needed. Made of vulcanized silicone rubber, fiber glass, cloth and metal-screen laminate. *Electro-Flex Heat, Inc.*

**92—VariDraulic Coupling** is a controllable hydrostatic fluid unit. Constant-speed power source can be made to apply power smoothly to suit speed or torque of load requirements. Provides flexible, shock-free speed control. Sizes to meet needs. *Hydraulics, Inc.*

**93—Ultrasonic Cleaner,** 5-gal. size, is self-adjusting. Only operating control is on-off switch. Uses controlled spectrum of ultrasonic frequencies for uniform distribution of energy. Makes unattended production line applications feasible. *Narda Ultrasonics Corp.*

**94—Heating Wire,** in 1- to 2-mm. dia., reaches temperatures to 1110 C. Bends easily for intimate contact with object to be heated. Has good heat dissipation rating of 150 watts per sq. cm. Inconel sheath has inner wire of nickel-chrome alloy. *Amperex Electronic Corp.*

**89—Tele-Processing System,** for plants with decentralized operations, uses phone lines to send data from branch (photo) to central receiving station. Operator dials station, inserts card in transmitter, presses carriage to send. *International Business Machines Corp.*



**90—Overhead Conveyor** uses principle of rotating screw to move loads along its route. Makes changes in speed and station stops by changing pitch of helical feed coil. Simple hook-type hangers are attached at any point. Needs no lubrication. *Philips & Davies, Inc.*

**95—Manual Impact Wrench,** used like ordinary ratchet wrench, loosens "frozen" nuts in seconds, or tightens them to maximum practical tension. Portable Swench uses no auxiliary equipment, works smoothly. Three models for bolts from ½ to 2½ in. *Curtiss-Wright Corp.*

*Turn to page 128*

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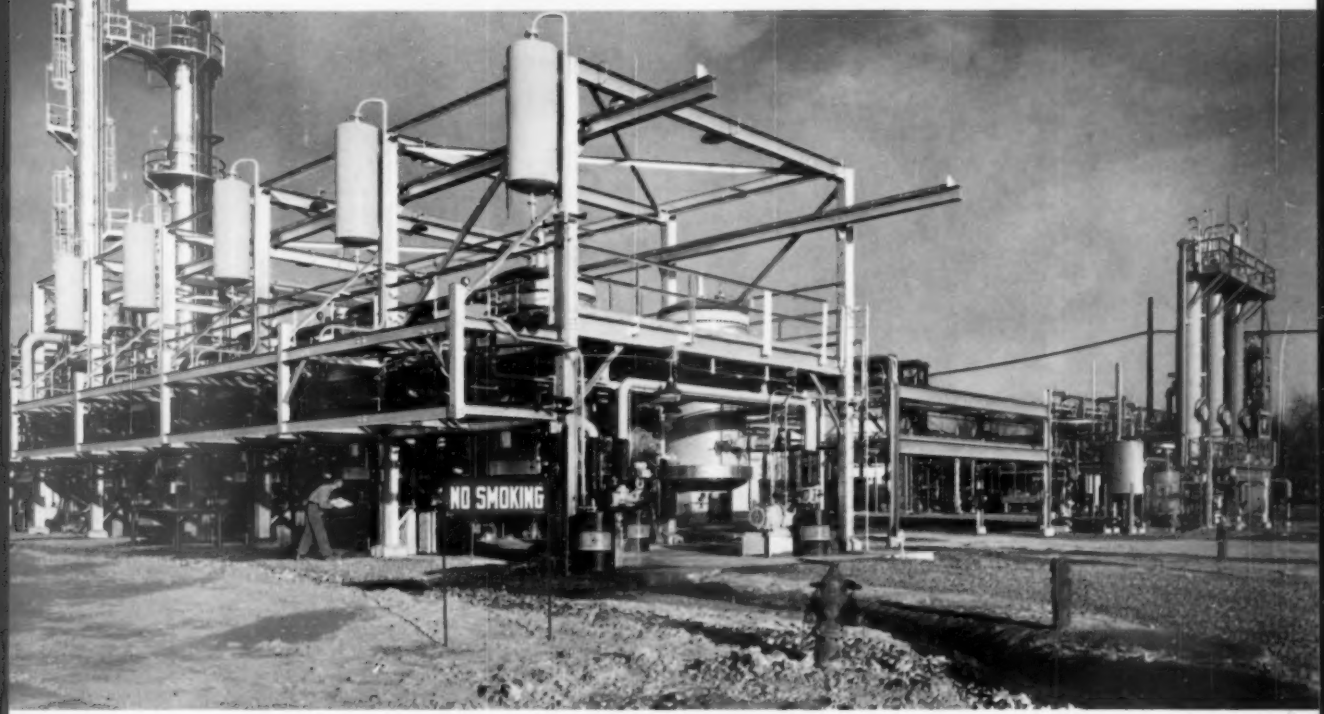


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# R-W "TWIN-TRAK"
## OVERHEAD AUTOMATIC DISPATCH SYSTEMS

An R-W "TWIN-TRAK" Overhead Automatic Dispatch System consists of one or more Power Tracks and as many Storage or Load Tracks as desired plus Switches, Carriers, Accessories and Power Equipment. "TWIN-TRAK" Systems are economical to install operate and maintain . . . easily expanded, altered or relocated as necessary.

Industry's prime goal throughout the '60's will be to achieve substantial manufacturing cost-reductions. The handling of materials offers the greatest cost-cutting frontier and reduced costs will be accomplished only with a true "integrated" materials handling system . . . a system that co-ordinates all processing functions on a *door to door* or *plant wide basis.*

R-W "TWIN-TRAK" Systems offer this materials handling concept of tomorrow—*today*. For here is a completely automatic conveying system that not only moves products from one point to another, but automatically conveys parts and components to predetermined work stations throughout all production processes . . . parts and components that are automatically selected "from overhead" inventory banks and conveyed *where* they are needed—*when* they are needed. R-W "TWIN-TRAK" Systems not only improve materials handling but also permit the co-ordinated use of new production techniques and machinery to provide "machine muscle" for the raising, lowering, moving and transferring of parts and components to produce products faster and more economically. Now is the time to investigate the "cost-saving" potential offered by an R-W "TWIN-TRAK" Overhead Automatic Dispatch System.

If you are planning to modernize your present plant or build a new one, it will be to your advantage to let a qualified R-W Materials Handling Specialist survey your facilities or plans. At no obligation, he will gladly submit a plan to show you how to best solve your specific materials handling problem. Write for "TWIN-TRAK" Catalog.

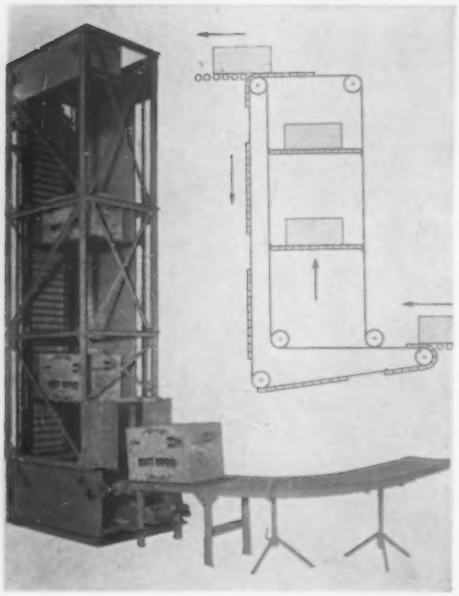
R W

**Richards-Wilcox**

**MANUFACTURING COMPANY**

**MATERIALS HANDLING DIVISION**

410 W. THIRD ST., AURORA, ILL. Branches in all Principal Cities



# Continuous Conveyor lowers to any level

Stop right here if an entirely new kind of continuous vertical conveyor is of no interest to you. Still with us? Then you'll want to know that it's low in cost and occupies little space. Here are other things the Escaveyor can do:

1. Load itself automatically while in motion from a feeder conveyor line that has an automatic spacing device.
2. Unload automatically while in motion.
3. Adapt to up, down, or reversible movement to provide floor-to-floor service with the continuity of a belt or roller conveyor.

And that's not all. The platforms, carrying cartons from one level to another, raise or lower in a horizontal position, then fold for return trip. Series of platforms are secured to endless chains moving in one direction and powered by a common drive shaft. This feature permits compact installation. Fits into space only slightly larger than the platform to allow for platform return.

Besides its obvious uses as an up-down-type, the conveyor can be adapted to a wide range of conveying systems. These include multi-story with transfer points on any floor, up-across-and-down, or down-across-and-up for getting over or under obstacles.

The unit is ideal for moving partial assemblies between floors, handling finished goods in cartons, lifting cases to storage racks. *Standard Conveyor Co.* (Circle 96).

**97—Water Nozzle** spouts water when you flex tip, cuts off automatically when you throw hose aside. In two sizes: ¼- or ¾-in. pipe thread. No handles, levers, springs, or packing. Nothing to break or clog. *Heckethorn Mfg. Co.*

**98—Axial Flow Blowers** handle from 1000 to 500,000 cfm. with pressures from atmospheric to 10 in. of water. Come in fixed blade design to 12-in. diameter, or special blade design from 14- to 120-in. diameter. *Benson Mfg. Co.*

**99—Aluminum-Head Hammer** transmits accurate blow without high rebound. Non-chipping, non-sparking, non-spalling. Reduces eye injuries. Sizes from about 2x2x4 in. (13 oz.) to 2x2x5 in. (over 2 lb.). *Frank N. Wood Co.*

**100—Ball Valve,** with no resistance to flow, creates no turbulence or pressure drop. Mounts in any position. Optional ratchet opens or closes valve easily. In ⅜- to 2-in. sizes, pressures to 1000 psi. *Besler Corp.*

## Prepares reports two at a time

Standard Flexowriter automatic machine, when connected to this Systems Receiver, runs off two different documents at once (using same data). Needs one operator. Cuts report-making time. Paper tapes automatically operate, control both machines. Accurate and versatile. *Friden, Inc.* (Circle 101).

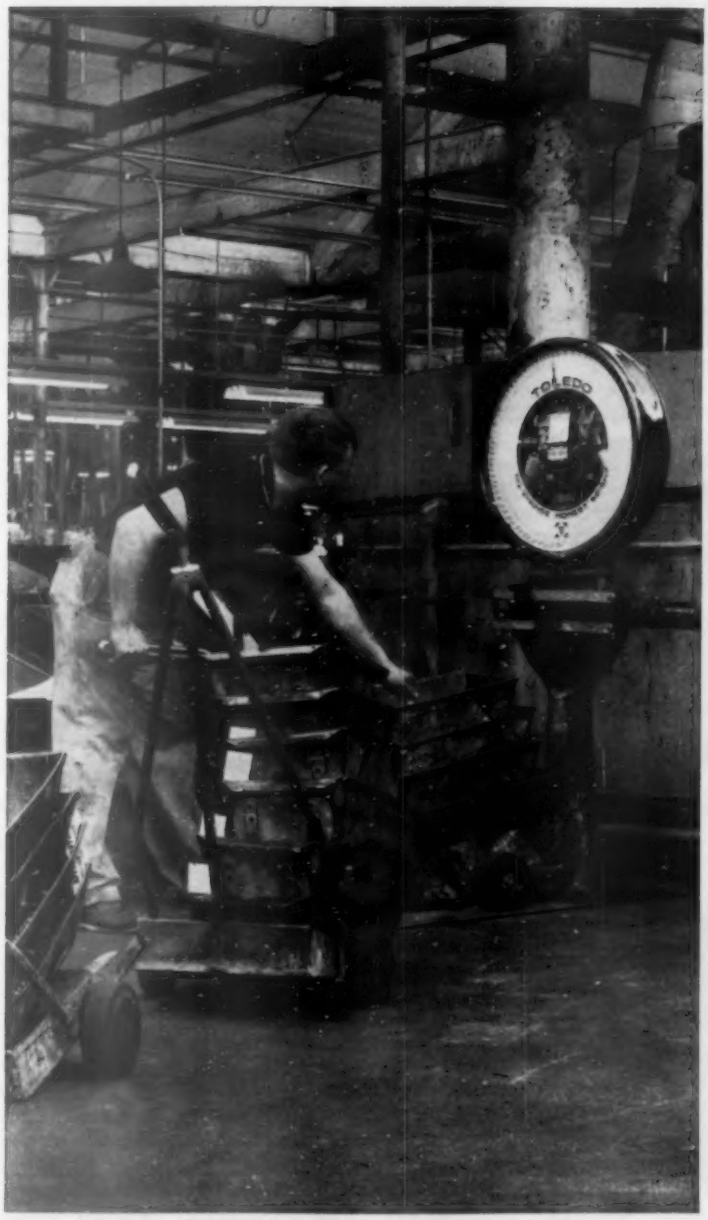
## Emergency oxygen in midget pack

A 1½-hour supply of oxygen packed in this portable, lightweight (under 2 lb.) sphere-shaped container fits into the palm of your hand. Supplies oxygen to cardiac victims or other emergency cases at a cost of pennies-per-minute. Replaces cumbersome cylinder-shaped containers weighing up to 125 lb. Simple-to-use mask pressed against face starts smooth regulated flow of oxygen. No shut-off valves, gages, or breather bags to bother with. Optional accessories: rack and plastic holder for mounting in plant. *Breath-O'-Life Oxygen Inc.* (Circle 102).



*Turn the page*

# B.F.Goodrich Oil-Pruf industrial tires go where it kills other tires to roll




**TONS OF SCREW PRODUCTS** are hauled from headers to weighing and cleaning stations every month at Pheoll Company's Chicago factory. Dolly tires are subjected to abrasive metal and cutting oil, used to fail prematurely. Then the TW Analysis Man recommended B.F.Goodrich Oil-Pruf compound tires. Result: 40% longer tire life!

**Specify B.F.Goodrich tires when ordering new equipment**

## Fastener company follows advice of B.F.Goodrich TW Analysis Man —gets 40% longer tire life

Pheoll Manufacturing Co., one of the country's largest producers of screw products, had a costly tire problem. Dollies used to deliver slugs from cold heading machines to weigh stations had to roll over floors unavoidably coated with cutting oils and metal shavings. Oil softened the tires—sharp metal tore them. Tires failed; downtime and maintenance costs skyrocketed.

Then the B.F.Goodrich Tire and Wheel Analysis Man suggested the company switch to tires made of B.F.Goodrich Oil-Pruf compound. Result: tire life increased 40%. Maintenance and replacement costs substantially decreased.

This case history is typical of the savings B.F.Goodrich Tire and Wheel Analysis Men offer. Without cost or obligation, the TW Analysis Man will study your setup—floors, loads, equipment, etc. Then he'll recommend the BFG tires that will give longest service at lowest cost—advice that is unbiased because B.F.Goodrich makes a complete line of industrial tires. Why not take advantage of this free B.F.Goodrich service? Mail the coupon today.

A special BFG consulting service is available to manufacturers of materials handling equipment.

**Smileage!**

**A FREE B.F.Goodrich TW Analysis can save you as much as 50% on industrial tires, as much as 20% on maintenance costs. Mail the coupon today.**

*The B.F.Goodrich Company*
*Dept. TW-824, Akron 18, Ohio*

Please send me additional information on your free Tire and Wheel Analysis Plan.

Name_____

Company_____

Street_____

City_____ Zone____ State_____

**NEW! DYNA-V DRIVES**
*Save space, weight and cost!*

**DODGE PARA-FLEX**
**The Flexible Cushion Coupling**
*with the 4-way flex!*

**FLEXIDYNE**
**The Dry Fluid Drive**
*New soft starts — overload protection*

●

**Write for Bulletins!**

- ✓ Dyna-V Drives — selection data.
- ✓ Para-flex Couplings—data.
- ✓ Flexidyne Drives & Couplings.

**DODGE MANUFACTURING CORPORATION**
**400 Union Street • Mishawaka, Indiana**

**DODGE**
*of Mishawaka, Ind.*



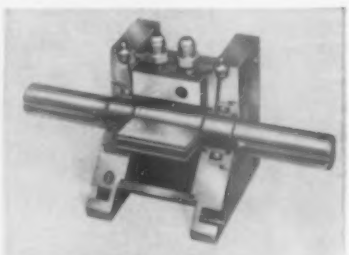

**For more about these items, circle numbers on Reader Service Card next to back cover.**

**103—Portable Vacuum** operates only on compressed air to provide suction for as many as eight probes handling small, delicate parts. Low cost, weighs under 5 lb. Can be regulated to produce just enough suction to lift item being handled. *Air-Vac Engineering Co.*

**104—Back-up Flange** breaks in half to cut down time of installation, handling, and maintenance. Its end leaves interlock. No danger of flanges slipping down pipe or smashing fingers during line changeovers. In ¾- to 30-in. tube and pipe sizes. *Farwell Metal Fabricating.*

**105—Bin Level Control** spots either presence or absence of material in processing or storage containers. Especially suitable for powdery or granular mixtures. Electronically operated unit has built-in fail-safe feature. Mounts on 1¼-in. pipe coupling. *Flo-Tronics, Inc.*

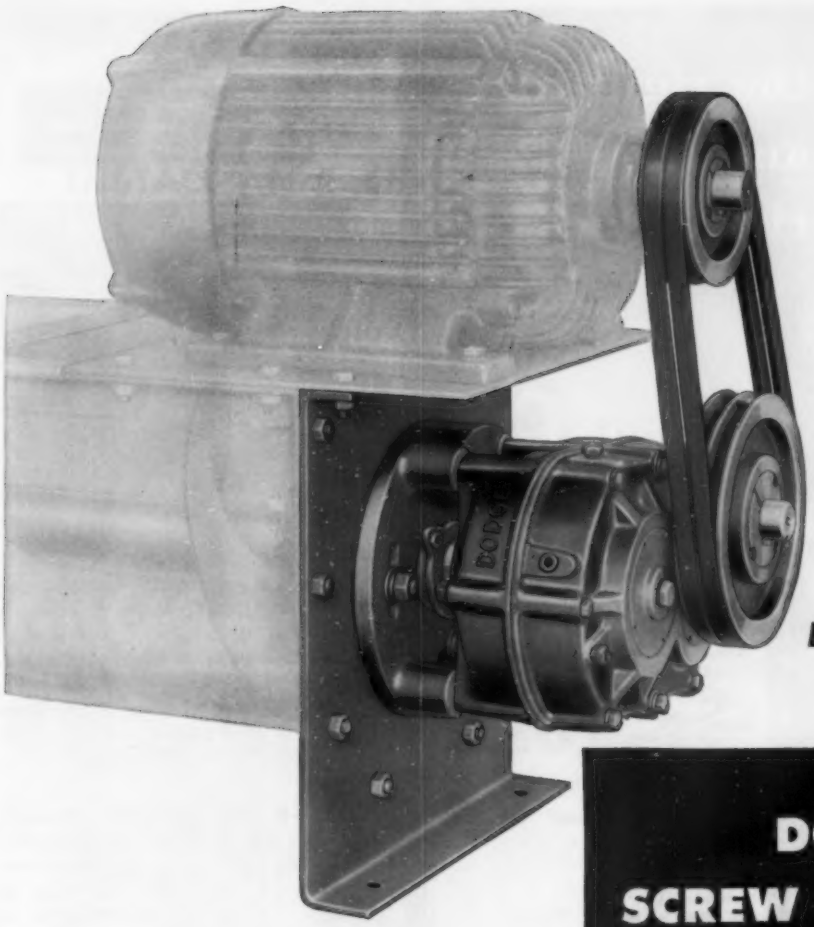
**106—"Call Commander"** with 18 pushbuttons for outside line and intercom service, has three times as many buttons as standard phones. Holds up to 17 calls. Has several signaling methods for intercom stations. Can be adjusted for conference calls. *Automatic Electric Co.*



**107—Oscillating Motors,** hydraulic or pneumatic, provide instant full torque from 100 to 430,000 in.-lb. Can be used for clamping, indexing, valving, pushing-pulling, feeding, lifting, and locking. Operate at 2000 psi. Rotate 100 or 280 deg. *Roto-Tork Mfg. Co.*

**108—Portable TV Camera** provides an 800-line resolution image at low light levels. Uses Image Orthicon tube. Lightweight, transistorized, with pre-amplifier mounted within camera. Modular construction simplifies service, maintenance. *Thompson Ramo Wooldridge Inc.*

*Turn the page*



***Entirely New!***

***Entirely Different!***

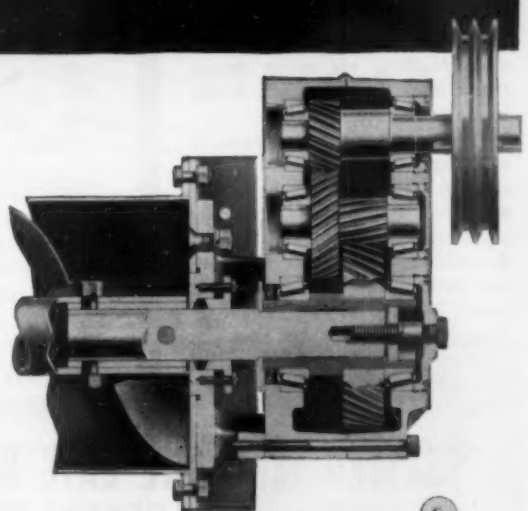
# DODGE SCREW CONVEYOR DRIVE

***A complete package drive, including***

- **Rugged, high-efficiency Reducer.**
- **Quick-removable Driving Shaft.**
- **External Packing Gland.**
- **Trough End (optional).**

Amazing new ease of installation—new ease of maintenance—new economy! No external thrust bearing or motor base is necessary. (However, a motor base of special design is available as optional equipment.) Pre-selected Taper-Lock V-Belt drives give required speeds. Built-in puller makes it easy to change driving shaft—without opening reducer. External packing gland protects reducer. Helical steel gears. Timken Bearing equipped throughout. Available from stock with 1½", 2", 2 7/16", 3" and 3 7/16" driving shafts. Ask your Dodge Distributor, or write us for bulletin giving complete technical data.

DODGE MANUFACTURING CORPORATION, 400 Union, Mishawaka, Ind.



**DODGE**

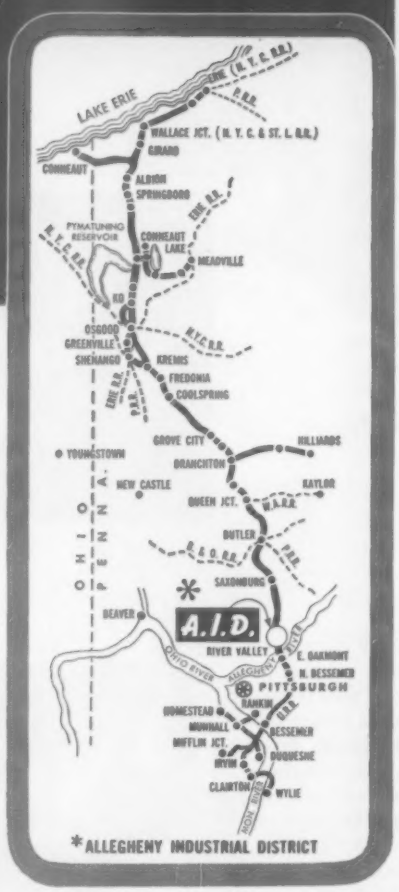
*of Mishawaka, Ind.*

**CALL THE TRANSMISSIONEER**—your local Dodge Distributor. Factory trained by Dodge, he can give you valuable help on new, cost-saving methods. Look under "Dodge Transmissioneer" in the *white* pages of your telephone directory, or in the yellow pages under "Power Transmission Equipment."

Now is the *right time* to build your new plant or warehouse, and the *right place* is the 140 acre fully developed Allegheny Industrial District. Just 14 miles from downtown Pittsburgh, you get fast Bessemer freight and piggyback service to the nation's principal markets via seven major trunk lines. There's quick access to major highways, too.

Other strategic advantages of an Allegheny Industrial District site are: 24-hour delivery of steel and other basic materials; an ample labor force with skills widely diversified; all utilities to meet any production or warehousing need; located at the center of America's No. 1 market area.

Investigate today! Write or phone for location factors. Complete confidence is assured.




**BESSEMER and LAKE ERIE RAILROAD CO.**

INDUSTRIAL DEVELOPMENT DEPARTMENT

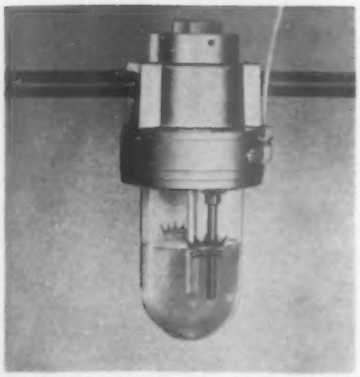
1828 FRICK BUILDING • PITTSBURGH 30, PA. • ATLANTIC 1-4780

*The Bessemer Man is at your "Site Service"*


## FACTORY/EQUIPMENT NEWS

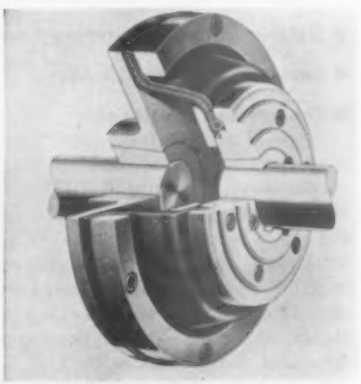
*Begins on page 124*

For more about these items, circle item numbers on Reader Service Card next to back cover.



**109—Lubricator,** for air-operated devices, uses changes in pressure (pulses) to meter exact amount of oil where needed. Works independently of air-flow rates and flow periods. Can be set to release drop every 3 or 4 pulses and up to 100 or more. *Parker-Hannifin Corp.*

**110—X-Ray Analyzer** provides multi-element analysis of materials in continuous flow. Simultaneously checks six elements from light to heavy. Gives graphic analysis of composition whether in liquid, slurry, or solid (dry or moist powders) form. *General Electric Co.*

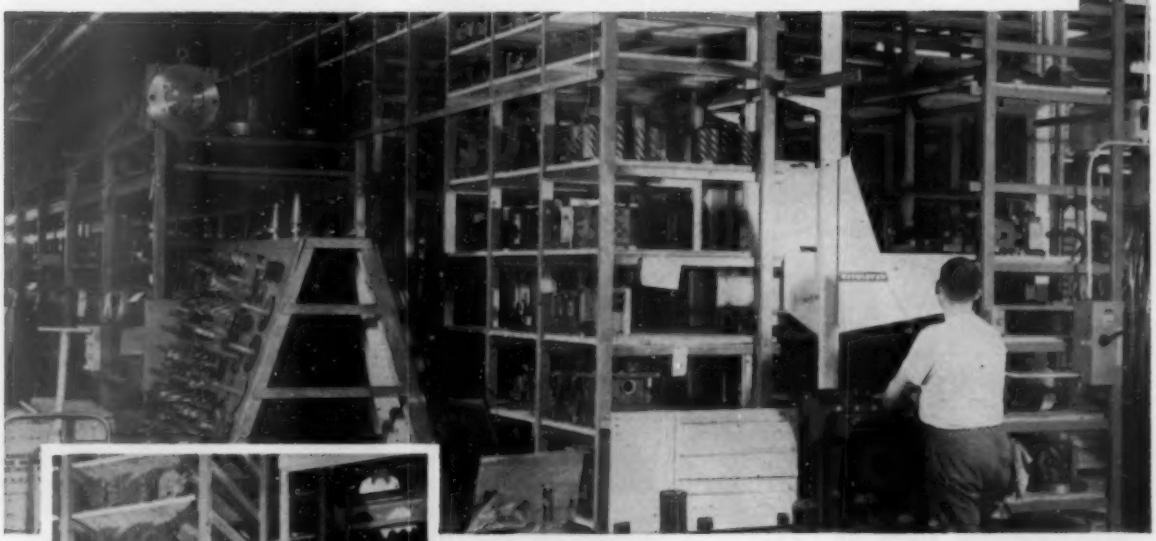


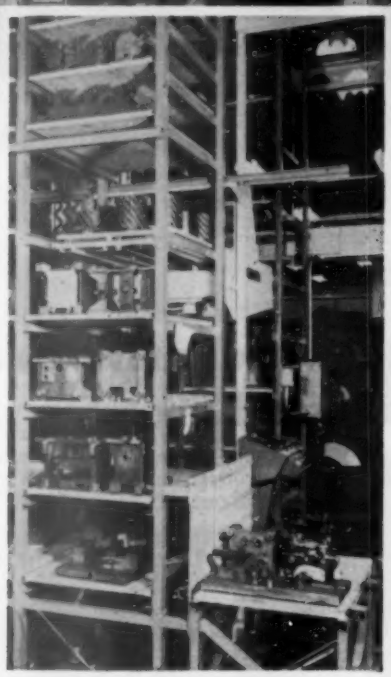
**111—Drive Coupling** has pan-shaped rubber flexing element to permit speeds to 5230 rpm. Can be used to drive hammer mills, compressors, pumps, fans, blowers. Also good for low-speed use with high torque. Flywheel type available, too. *Dodge Mfg. Corp.*

*Turn the page*

# BURSTING AT THE SEAMS!

## INSTALL AN R-46 FINGERTIP CONTROL TOOL CRIB





### SAVE 70% ON SPACE . . . 30% ON LABOR!

In this new R-46 *Retriever*® installation at the New Philadelphia, Ohio, plant of the Warner and Swasey Co., many factors were of prime consideration.

A need for storage of dies, fixtures and special tools . . . making maximum use of a limited amount of space and offering quick, easy access to the items stored . . . presented pressing problems.

As installed, the TRIAX® R-46 *Retriever* provides 768 openings of 1000-lb. maximum capacity with a load base dimension of 24″ x 36″ . . . twice as much storage volume as was available with the equipment previously used. 3,270 square feet of floor space was released for other use. Tooling time and return to storage time were significantly reduced.

In this case, the *Retriever* helped solve a serious space shortage and tool die and fixture storage problem. It is also being used for work-in-process, electric motors storage, and other material handling applications.

We would welcome the opportunity to discuss the possible advantages of an R-46 *Retriever* installation in your factory or warehouse.

*F.O.B. Euclid, Ohio

This simple, push-key console controls the unique two-way *Retriever*®. The keys on the left set the *Retriever* to deliver an incoming load into the desired opening. Setting the right-hand panel will direct the *Retriever* to bring back any other load on the return trip.

**THE TRIAX COMPANY**

SWeetbriar 1-9800

**11955 SHAKER BLVD. • CLEVELAND 20, OHIO**



For more facts Circle 443 on Reader Service Card

# NOW! You Can End Refuse Storage Problems...WITHOUT Capital Outlay

IN ALL LEADING CITIES
FROM COAST TO COAST

## DUMPMASTER-Equipped Private Haulers Provide Containers and Efficient Service

If you're plagued with trash piles, scattered refuse, fire hazards, and hit-or-miss collection, there's a good chance you can do something about it . . . WITHOUT CAPITAL OUTLAY!

In most major cities DEMPSTER-DUMPMASTER-equipped private haulers will put clean, big-capacity storage containers at convenient locations in your plant . . . empty them mechanically on schedule, or on a call-in basis . . . all for a reasonable monthly fee.

When you containerize your refuse, plant housekeeping becomes easy, employee morale goes up.

Write today for the name of your nearest private hauler. We'll also send literature describing his service.

DEMPSTER DUMPMASTER®
Equipped Private Haulers

**Write Today for**
**Free Brochure and Name of Nearest Private Hauler**
**DEMPSTER BROTHERS**
**Inc.**
**Dept. F-9 KNOXVILLE 17, TENNESSEE**

For more about these items, circle item numbers on Reader Service Card next to back cover.

**112—Squirrel-Cage Motor, 250 to** 1000 hp., is built for heavy-duty use. Smoothly contoured steel enclosure resists corrosion. Compact unit mounts in minimum space. Drip-proof. In 440 to 4160 v., 60 cycles, full load speeds: 1160 to 3500 rpm. *Wagner Electric Corp.*

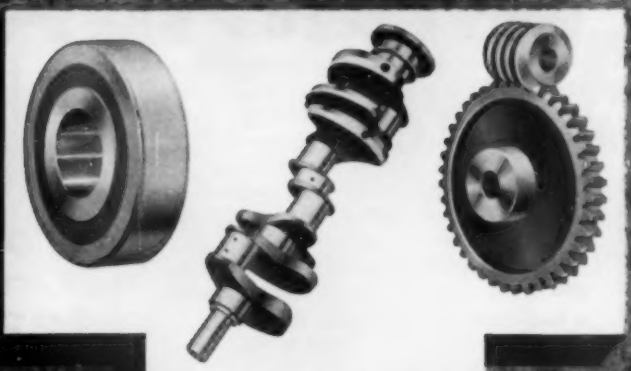
**113—Wash-up Faucet** can be set to deliver from a squirt to a gallon, then it shuts off automatically. Once you push valve plunger, there's no need to hold it down. No water is wasted, saves time in washing up. Self-cleaning feature prevents pipe clogging. *Speakman Co.*

**114—Mobile Oil Filter** gets ride of contaminants of 0.5 or 3.0 microns. Change in filtering is made by replacing filter element and re-setting panel valve. Built-in 20-gal. reservoir. Cleans and recirculates continuously, stores, then recirculates. *Walter Kidde & Co.*

**115—A-C Voltmeters and Ammeters,** for switchboard use, are accurate to 1%. Priced substantially below existing instruments. Normal ammeter movement is 5 amp.; self-contained ratings to 30 amp. available. Voltmeter ratings: 150 to 600 v. *General Electric Co.*

*Turn the page*

VALVOLINE
Tectyl
protects metals
against RUST



VALVOLINE'S amazing Tectyl rust preventives protect metal surfaces against *rust and corrosion* during storage and shipping.

Low-cost Tectyl compounds are easy to apply by brush, spray or dip and just as easy to remove. They protect metal surfaces against the effects of snow and rain... salt air, humidity, perspiration and corrosive fumes.

Tectyl rust preventives meet exacting government specifications.

**Write today for these two helpful Tectyl charts**

**1.** "Valvoline Tectyl U. S. Government Approved Packaging and Preservative Chart." Gives the Army, Navy, Air Force and other Government Agencies' specifications and applications.

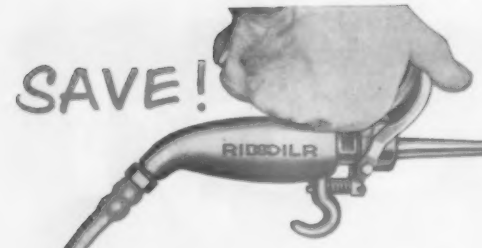
**2.** "Valvoline Tectyl Industrial Rust Preventive Comparison Chart." Specifies applications covering the industrial field.

VALVOLINE
Tectyl RUST PREVENTIVES
VALVOLINE OIL COMPANY, Freedom, Pennsylvania
Division of Ashland Oil & Refining Company



For more facts Circle 445 on Reader Service Card

SAVE! SAVE!




**From $25 to $450 a year on Oil Alone . . . with a RIDOILR!**

How much oil do you use each day threading pipe, rod or conduit by hand or power drive?

One-half pint? One gallon? If it winds up on the floor, you're spending somewhere between $25 and $450 a year just for the privilege of cleaning up oil.

The RIDOILR saves that money for you . . . lets you use all the oil you should!

- **Ends Oil Waste and Messy Floors**—Costly oil is double screened and re-used again and again.
- **Lengthens Die Life**—Well oiled dies last longer, stay sharper . . . gives cleaner threads for fast, easy installation.

The easy-to-carry RIDOILR comes complete with a screened chip pan, circulating oil reservoir and hose-connected hand pump-gun. See it . . . buy it at your local Supply House. You'll be glad you did!

Costs Only $23.20 with 2 gallons of RIDID Thread Cutting Oil!

RIDID Dark and Nu-Clear Thread Cutting Oils are available in convenient (4 ounce Nu-Clear only), 1 quart, 1 gallon, (2 gallon Nu-Clear only), 5 gallon, 30 gallon and 55 gallon containers.

RIDGID

The Ridge Tool Company, Elyria, Ohio, U.S.A.


## FACTORY/EQUIPMENT NEWS

*Begins on page 124*

For more about these items, circle item numbers on Reader Service Card next to back cover.

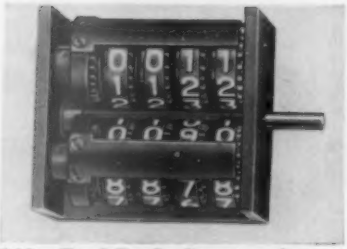
**116—D-C Power Supply** has "constant watts" circuit to protect it against overload, short circuits, misadjustments, high line voltages. Convection-cooled for static operation. Comes with 115-v., 60-cycle input, 1.5 to 100 v. output. Transistorized. *General Electric Co.*

**117—Safety Switch,** 30 to 60 amp., 250 to 600 v., has double blades to minimize pitting and burning; quick-make-and-break mechanism; wiring space for fast installation. Other features include double insulation and arc snuffers that minimize damage. *Clark Controller Co.*

**118—Electric Pushbutton,** for stamping presses, is palm-operated. Easily installed in machine cavity or in its own oil-tight enclosure. Recessed legend plates are color-coded. Standard model has single-pole, double-throw snap switch, or optional two switch. *Square D Co.*

*Turn the page*

For more about these items, circle item numbers on Reader Service Card next to back cover.



**119—Dual-Bank Counter,** for use on machine tools and digital readout equipment, adds and subtracts simultaneously. Nylon wheels and pinions reduce torque for higher speeds, longer life. Withstands wide range of temperatures from −55 to +85 C. *Durant Mfg. Co.*

**120—D-C High-Voltage Tester** is portable for production, maintenance and field testing of motors, transformers, cables, and insulating materials to 5000 v. Lights up automatically to show failures. Weighs 20 lb.; operates on 110 v.; a-c. *Associated Research, Inc.*

**121—Elapsed Time Indicator** has range of 99,999.9 hours (also comes in minutes) with minimum time indication of 1/10 hour. For time study and cost analysis, etc. Rated 115 or 230 v., 60 cycles; other ratings available. Costs $10. *Automatic Timing & Controls.*

*Turn the page*


# New RIDGID® No. 141 Geared Threader

## For 2½", 3", 3½", 4" Pipe and Conduit

## Save Time...Cut Costs on all large threading jobs!

**1. Only 1 Set of High Speed Dies** threads 2½", 3", 3½" and 4" pipe and conduit. No extra die sets to change or lose! Die size selector plate sets quickly and locks at desired size. Easy adjustment for tapered, straight, over or under size threads.

**2. Jam-Proof** for safe threading by power or hand. Drive pinion kicks out automatically. Die head *Can't Jam* . . . avoids costly repairs and delay.

**3. New Fast-Action, Cam-Type Workholder** sets to size by quick turn of collar. Set screw holds work centered for perfect threads every time . . . adjustable for drip threads.

**Your Supply House has them! Order your new RIDGID No. 141 Threader today!**

RIDGID®
The Ridge Tool Company, Elyria, Ohio, U.S.A.

For more facts Circle 447 on Reader Service Card

# THE MOST COMPLETE LINE OF MECHANICAL PACKINGS*
## SOLD THROUGH INDUSTRIAL DISTRIBUTORS

*Dependable Local Service •*
*Always Available •*
*Prompt Delivery*

*Find the Belmont Distributor nearest you in Conover-Mast Purchasing Directory*

* HIGH PRESSURE ASBESTOS • ROTARY PUMP PACKINGS • VALVE PACKINGS • V-RINGS • LEATHER PACKINGS • SHEET PACKINGS AND GASKETS • HYDRAULIC & PNEUMATIC PACKINGS • METALLIC PACKINGS • PLASTIC PACKINGS • TEFLON PACKINGS & GASKETS • SPIRAL WOUND GASKETS

*Better Buy*
**BELMONT**

THE BELMONT PACKING & RUBBER COMPANY • PHILADELPHIA 37, PA.




## FACTORY/EQUIPMENT NEWS

*Begins on page 124*

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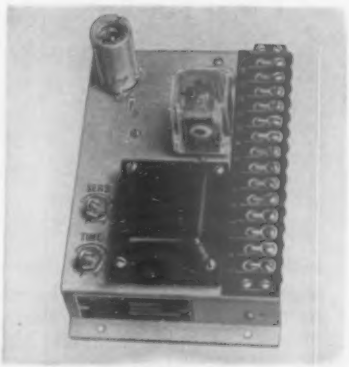
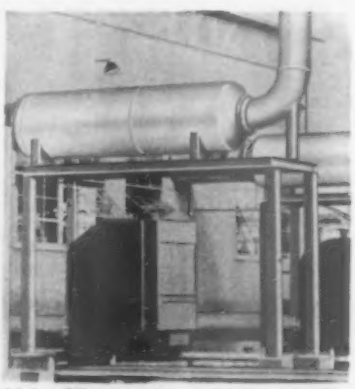


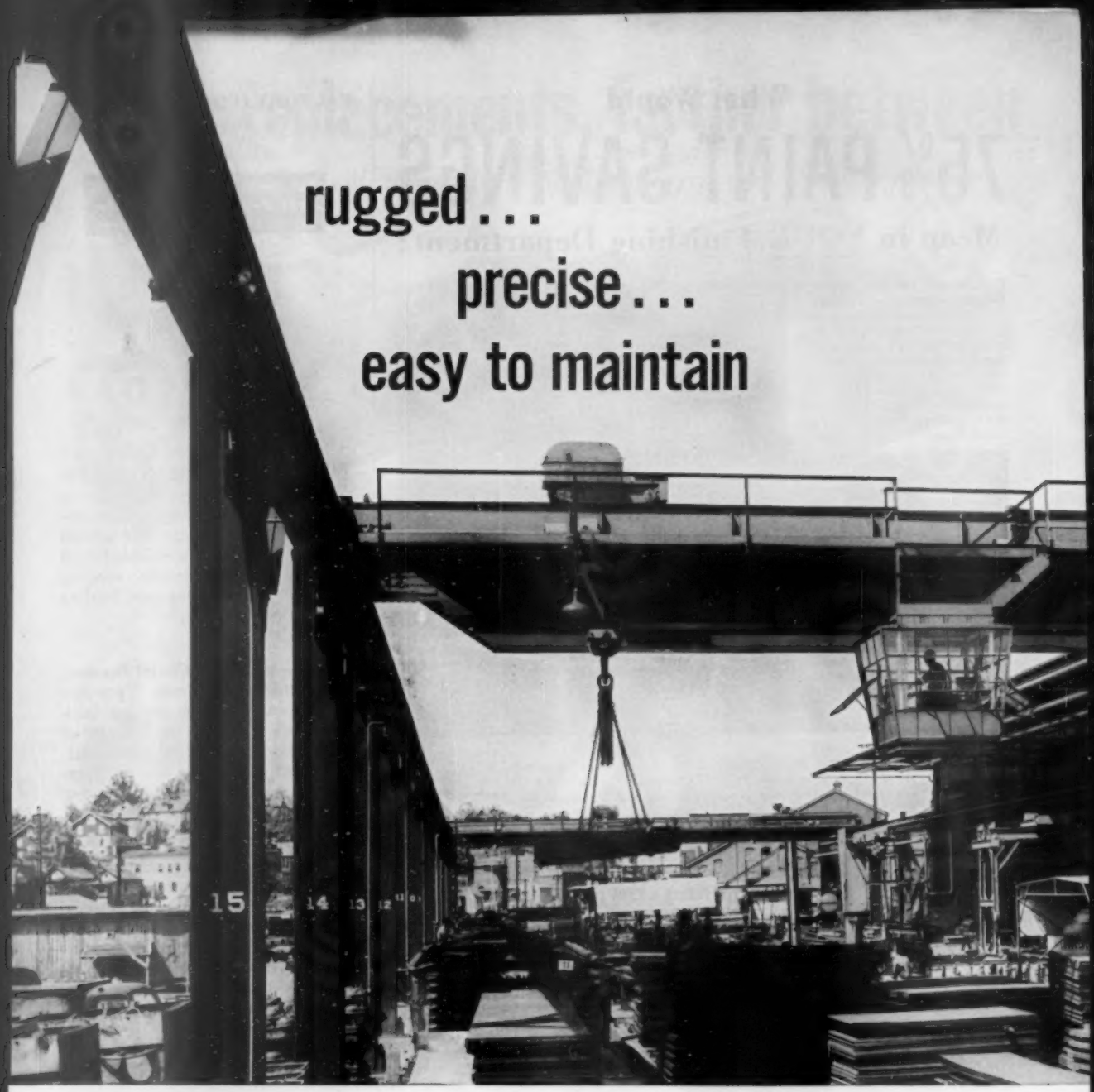
**122—Photoelectric Scanner Relay** has time-response adjustment that allows light beam to be interrupted repeatedly for intervals shorter than the selected delay time. On conveying system, relay shows when parts fail to feed or jam up on belt. *Farmer Electric Products Co.*

**123—Recorder-Annunciator** charts the minute-by-minute production rates of a number of machines or processes. Also relates this rate to heat, amp., speed, or other variables. Comes in charts to 4x6 ft. that record from 100 to 400 quantities. *Keinath Instrument Co.*



**124—Silencer,** in multiple-chamber design, muffles hazardous and loud noises from engine intake or exhausts, blower intakes or discharges, etc. Explosion-resistant, it mounts vertically or horizontally. Sizes: 1 to 3½ in. or 4 to 30 in. *Universal Silencer Corp.*

*Turn the page*




# Westinghouse crane control

Precision built to crane-duty standards . . . long-term, low-cost service with easy operation and low maintenance costs . . . the most complete line of magnetic crane control available . . . 'round-the-clock service facilities in all areas . . . all components service-proved . . . undivided responsibility from one supplier . . . just several of the reasons why you can count on dependable, more economical service from cranes equipped with Westinghouse control. Your nearby Westinghouse salesman has all the cost-saving facts. Or, write Westinghouse Electric Corporation, P.O. Box 868, 3 Gateway Center, Pittsburgh 30, Pennsylvania. J-22145

Photo above shows material bay of main carshop of Norfolk and Western Railway in Roanoke, Virginia, in which operate two twenty-five ton Whiting cranes, equipped with Westinghouse Load-O-Matic* a-c control systems, handling heavy plate and other material for car-manufacturing operation. Westinghouse Load-O-Matic crane control is ideal for applications requiring unusual stamina, ease of operation and low maintenance cost. Provides smooth, stepless speed control without the cost and complexity of d-c conversion equipment. *Trade-Mark

YOU CAN BE SURE...IF IT'S Westinghouse

For more facts Circle 449 on Reader Service Card

## What Would

# 75% PAINT SAVINGS

## Mean in YOUR Finishing Department?

**Designed for the New Decade**—Beautifully styled BAL HARBOUR line of aluminum furniture by AFCO was winner of the 1960 Apollo Award for pre-eminence in design. The uniform, high quality finish is applied electrostatically with the Ransburg No. 2 Process Hand Gun.

**Faster . . . Cleaner . . . Cheaper**—The "wrap-around" feature of the No. 2 Process Electrostatic Hand Gun paints all areas of this type of work from one side only, providing a 75% paint savings and a 700% increase in production volume over former air hand spray.

RANSBURG

Ransburg No. 2 Process Electrostatic Hand Guns are providing a 75% paint savings in the painting of beautiful AFCO aluminum furniture.

AFCO Aluminum Furniture Co., Inc., Miami, Fla., replaced hand spray with two Ransburg Electrostatic Hand Guns. Along with paint and labor savings, quality of the work was improved with greater uniformity. And, production volume was increased a healthy 700%! Formerly, they were painting approximately 100 items a day. NOW, with the faster, cleaner Electrostatic Hand Guns, they paint from 700 to 800 pieces per day. Electrostatic is faster because the "wrap-around" characteristic of Electro-Spray paints all areas of this type of work with a pass from one side only.

**NO REASON WHY YOU CAN'T DO IT TOO**

Write for information and literature about this revolutionary, new painting tool. See how the Ransburg Electrostatic Hand Gun can save time . . . paint . . . and cut costs in YOUR finishing department. If your production justifies, it'll pay you to investigate Ransburg's *automatic* electrostatic spray painting equipment. Write for our No. 2 Process brochures which show numerous examples of modern production painting in both large and small plants.

**RANSBURG Electro-Coating Corp.**

Box 23122, Indianapolis 23, Indiana




## FACTORY / EQUIPMENT NEWS


*Begins on page 124*


**For more about these items, circle item numbers on Reader Service Card next to back cover.**

**125—A-C Drip-proof Motor,** 20 to 40 hp., is shielded five ways against external hazards. Features splash-resistant enclosure, labyrinth seal on output shaft, double-shielded ball bearings, high dielectric winding insulation, and bearing cup. *Sterling Electric Motors, Inc.*

**126—Low-Voltage Circuit Breaker,** with integrated fuses, protects against single-phasing and overload. Draw-out type can be mounted 3 or 4 high in metal-clad switchgear. Fuse ratings to 200,000 amp. Handles up to 25,000 amp., 600 v. a-c. *Federal Pacific Electric Co.*

**127—Indicating Transmitter,** universal type, permits one movement to handle variety of sensing devices. Measures pressure, differential pressure, temperature, load, shaft position. Transmitter provides 0 to 200 mv., a-c output, 1 to 5 ma. d-c. *Taylor Instrument Co.*

**128—Proximity Switch** has two types of delay: slow-make and quick-break; quick-make and slow-break. Valuable for control of automatic parts feeders. Pick-up (at point of work) senses both ferrous and non-ferrous metal parts. *Electro Products Laboratories, Inc.*


*Turn the page*

# Fewer replacements, farther between

*...with these LINK-BELT conveyor and elevator chains*

***LINK-BELT C CLASS CHAIN*** combines cast malleable center links with steel sidebars connected by steel pins. Broad tops and bottoms provide ample sliding surfaces for drag conveyors. Also available with Promal or "file-hard" Promal center links for extreme loads and abrasive wear. Promal is the special Link-Belt metal that lasts much longer . . . costs but little more.

***LINK-BELT SS CLASS BUSHED CHAIN.*** If your conveyor or elevator must be lengthened, or load increase accommodated, you can install this all steel chain in place of C Class *without changing sprockets!* It offers hardened joint bearing surfaces for greater wear resistance in heavy-duty conveying and elevating. Smooth, tough joint surfaces repel gritty materials, prevent packing, and resist abrasion.

Full information on these chains . . . plus a broad line of attachments and sprockets—is contained in Catalog 1050. Get your copy by writing direct . . . or call your nearest Link-Belt office or authorized stock-carrying distributor, listed under CHAINS in the yellow pages of your Phone Directory.

**LINK-BELT**

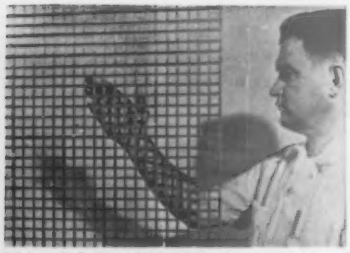
**CHAINS AND SPROCKETS**

**LINK-BELT COMPANY:** Executive Offices, Prudential Plaza, Chicago 1. To Serve Industry There Are Link-Belt Plants, Warehouses, District Sales Offices and Stock Carrying Distributors in All Principal Cities. Export Office, New York 7; Australia, Marrickville (Sydney); Brazil, Sao Paulo; Canada, Scarboro (Toronto 13); South Africa, Springs. Representatives Throughout the World.

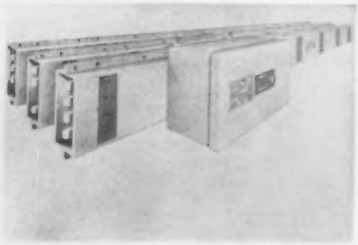


**For more facts Circle 451 on Reader Service Card**

For more about these items, circle numbers on Reader Service Card next to back cover.



**129—Lightweight Fencing,** made of flexible strands of glass rovings and polyester resins, is non-conductive, and fire- and corrosion-resistant. Rat-proof, no moisture pick-up; ⅜ in. thick on 1-in. center. In many colors. It cuts with hand tool. *Crompton & Knowles Corp.*



**130—Packaged Busway,** 100-amp. capacity, comes in pre-assembled sections of 5- and 10-ft. lengths ready to install with simple hand tools. Cost compares with that of conventional conduit and wire. Three- or four-wire plug-in construction is standard. *H. K. Porter Co.*

**131—Lift Truck** for narrow aisles (7 ft. wide) has hydraulic-powered caster that turns 180 deg. for full circle and to pinpoint load positioning. For transporting long, heavy loads such as bar stock, rods, etc. Capacity: 4000 lb; 24 volts. *Lewis-Shepard Products, Inc.*

**132—Automatic Vending Machine** serves either frosty cold malteds or piping hot hamburgers. Stores food in temperature range of 0 to 155 F. only inches apart in same cabinet. Visti-Vend, 30×35×6½ ft. high, offers up to 10 items in 5¢ to $1.50 price range. *The Vendo Co.*

**133—Pushbutton Timer,** for a-c or d-c, provides automatic shut-off and re-set with 0.0025 repeat accuracy. Mounts in three ways on lapping machines, mixers, ovens, tumbling and plating equipment. In 16 dial ranges from 6 sec. to 60 hours. *Automatic Timing & Controls, Inc.*

**134—Heavy-Duty Fork Truck,** maker's first fork-lift truck, comes with gas or diesel engine of 172-cu.-in. displacement. In 10-, 12-, 16-, and 21-ft. stacking heights, 3-stage masts. Capacity: 4000 lb. Easily moves material over rough or wet ground. *Ford Motor Co.*

*Turn the page*

COSTLY PRODUCTION MARKING PROBLEMS?

The solution is at your fingertips from Blaisdell—leading manufacturer of specialized industrially graded markers and writing instruments.

A SPECIFIC PROBLEM . . .
OR A COMPREHENSIVE SURVEY . . .
both are as close as your local Blaisdell factory-trained representative.

Over 600 surface engineered markers plus hundreds of job rated writing, reproducing, electronic tabulating and erasing instruments to meet the exacting specifications of your factory and office systems.

*A PRODUCT FOR EVERY PURPOSE—FOR EVERY MARKING AND WRITING SURFACE*
Available at better stationers everywhere.

**Contact us *NOW* for the name of your local Blaisdell representative.**

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Marking Specialists to Industry and Office

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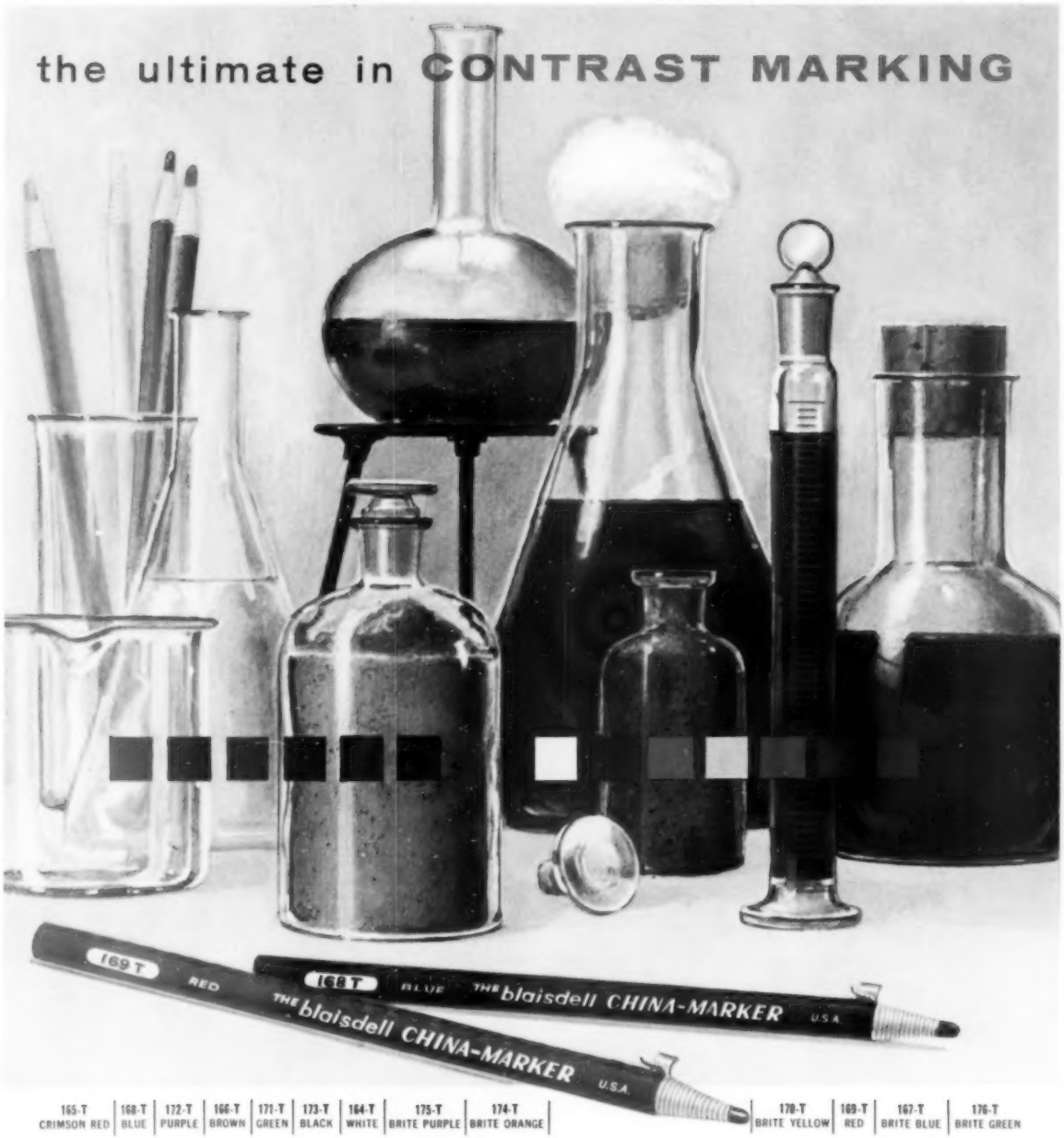
the ultimate in CONTRAST MARKING




165-T CRIMSON RED | 168-T BLUE | 172-T PURPLE | 166-T BROWN | 171-T GREEN | 173-T BLACK | 164-T WHITE | 175-T BRITE PURPLE | 174-T BRITE ORANGE | 170-T BRITE YELLOW | 169-T RED | 167-T BRITE BLUE | 176-T BRITE GREEN

# CHINA MARKERS BY blaisdell

These newly-improved markers now in two distinctive groups—BRITE *and* DEEP
—for the sharpest contrast possible in marking all light and
dark surfaces: china, glass, plastic, cellophane, metal, wood, et al.
Designed with exclusive Spee-D-Point *for quick repointing*
and Sted-D-Point *to hold leads securely.*
See for yourself how Blaisdell China Markers mark everything
better—brighter—sharper in 13 job-rated colors.

blaisdell PENCIL COMPANY • Bethayres, Pa.

# WONDERING HOW TO CUT PAINT MAINTENANCE COSTS?

If you want to cut maintenance costs, Herb Norton's a good man to talk to. A member of Du Pont's recently formed Technical Service Group, Herb's a specialist whose job it is to solve maintenance painting problems of every description. In his words:

"The further maintenance dollars go, the greater the return on your investment in plant and equipment. True costs, however, aren't determined solely by the price of the paint. To measure value accurately, you've got to take into account such factors as expense of application and length of time the paint job lasts. Believe me, it's false economy to start with anything but top-quality finishes. That's one reason Du Pont paints are so often specified.

"Another reason, equally important, is the expert guidance you get from Du Pont. You see, we go right into your plant or installation and make a thorough study of your individual maintenance problem. Then—drawing on our own experience, backed up by Du Pont technical competence—we formulate a painting program that meets your needs exactly. Service like this helps you achieve lasting protection against every conceivable corrosive condition, *at lowest cost per square foot per year.*"

If you have a maintenance problem you'd like to discuss with an expert, there's a man like Herb Norton in *your* area. To meet him, just call your nearest Du Pont district sales office. Or write: E. I. du Pont de Nemours & Co. (Inc.), Finishes Division, Dept. F-69 Wilmington 98, Delaware.

* * *

Herbert L. Norton came to Du Pont's Finishes Division in 1939, having studied chemical engineering at the Georgia School of Technology. As he added experience, increased responsibilities kept pace. Currently, Herb is Southeastern District Manager, Industrial Maintenance Sales. His background includes problem-solving in such areas of industry as textile, paper, petroleum, food, marine and public utilities.

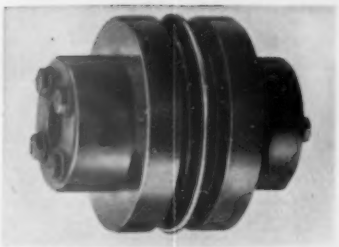
DU PONT PAINTS

BETTER THINGS FOR BETTER LIVING . . . *THROUGH CHEMISTRY*



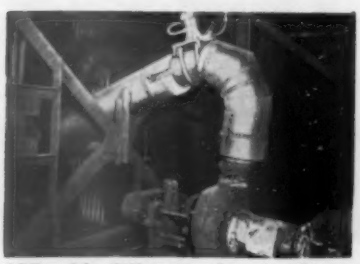
For more facts circle 453 on Reader Service Card

For more about these items, circle item numbers on Reader Service Card next to back cover.



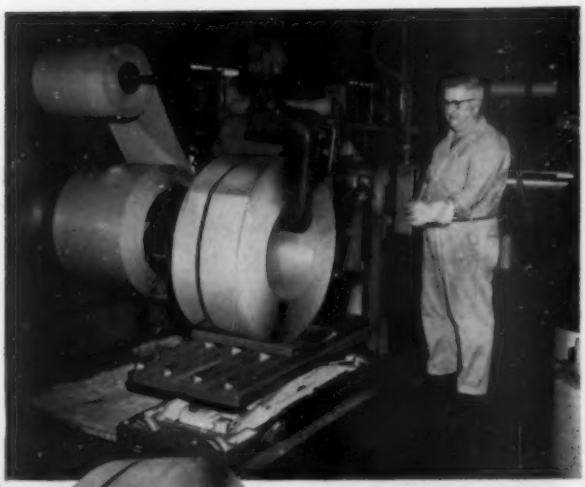
**135—Sure-Flex Coupling,** with a special detachable hub, permits the coupling of shafts spread as far apart as 7½ in. Withstands heavy shock and vibration, and all types of misalignment without wear or internal abuse. In ⅜- to 3¼-in. stock bores. *T. B. Wood's Sons Co.*

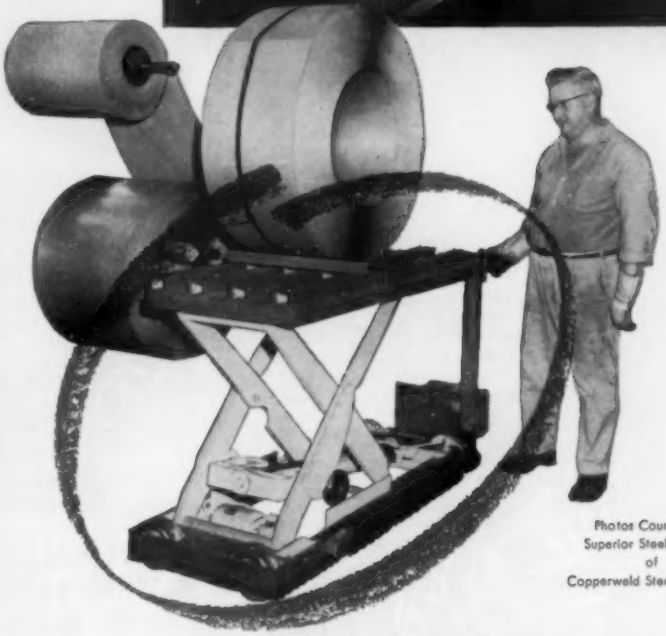
**136—Telematic Switchboard,** for automatic internal communications, can be easily expanded "builder-set" fashion by plugging in extra assemblies (photo) as needed. It can "grow" to provide up to 240 stations and 32 links. Easy to maintain. *Dictograph Products Inc.*



**137—Air Vibrator,** for 4-, 6-, or 8-in. pipe, keeps wet, moist material moving through all types of piping arrangements. Handles powdered coal, carbon black, fly ash, ores. One-piece design eliminates body assembly bolts, cuts maintenance. *National Air Vibrator Co.*

*Turn to page* 148





Photos Courtesy of Superior Steel Division of Copperweld Steel Company

**SOUTHWORTH "CUSTOM ENGINEERING" SOLVED THE COIL HANDLING PROBLEM AT SUPERIOR STEEL**

The "coil buggy" shown is one of several 5000-pound capacity, mobile and adjustable hydraulic Southworth Lift Tables* specially adapted for use at recoilers of Superior Steel with a triple purpose: (1) to safeguard workmen by reducing accident hazards; (2) to protect the highly polished surfaces of the quality stainless strip steels; and (3) to increase efficiency by facilitating the handling of the coils from the recoiler. The success scored by this installation is one more example of how Southworth engineers cut costs through improved use of existing facilities. Why not let Southworth help you increase safety, efficiency and handling at *your* plant? Write:

*PATENT PENDING

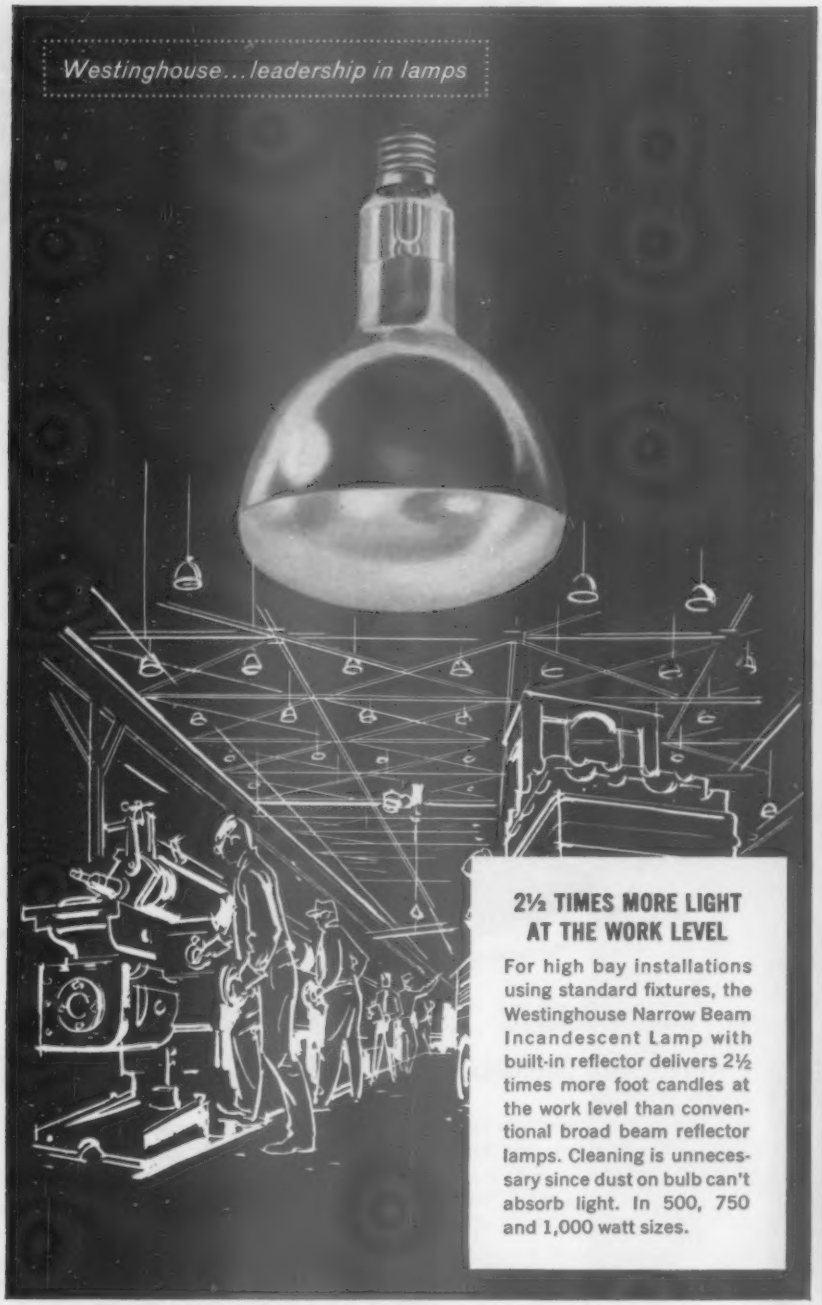
SOUTHWORTH MACHINE CO. Since 1890

**SOUTHWORTH LIFT TABLES**

a division of SOUTHWORTH MACHINE CO., 934 Warren Ave., Portland, Me.

For more facts Circle 454 on Reader Service Card

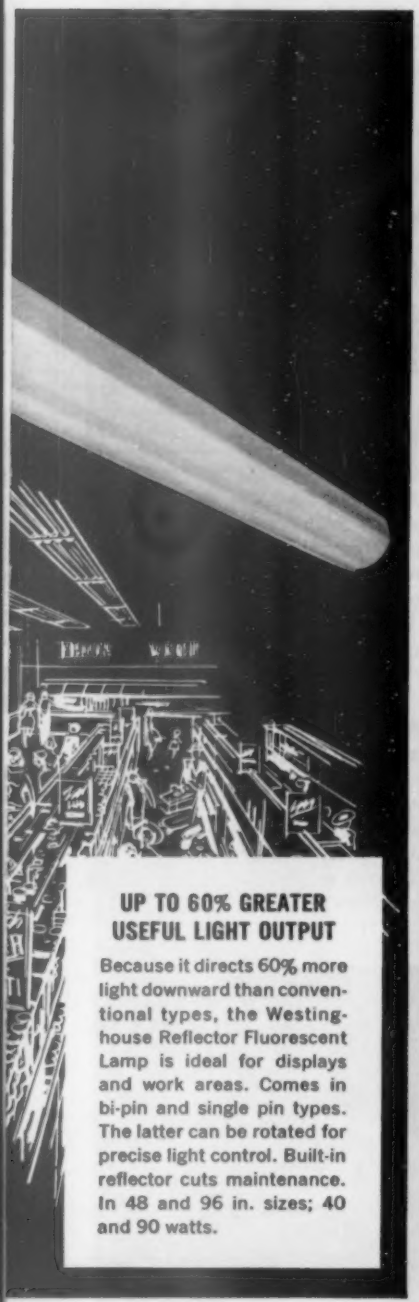
# FOR HIGH EFFICIENCY, LOW-COST LIGHTING


Westinghouse...leadership in lamps
2½ TIMES MORE LIGHT AT THE WORK LEVEL
For high bay installations using standard fixtures, the Westinghouse Narrow Beam Incandescent Lamp with built-in reflector delivers 2½ times more foot candles at the work level than conventional broad beam reflector lamps. Cleaning is unnecessary since dust on bulb can't absorb light. In 500, 750 and 1,000 watt sizes.

The high efficiency lamps shown above demonstrate the ability of Westinghouse to reduce lighting costs. In the Westinghouse line you'll find the correct lamp to give you one or more of the following benefits: greatest savings in lamp purchases; lowest maintenance cost; the most light at the same or lower cost; the most efficient use of power. Call your Westinghouse Lamp Representative today. You can be sure . . . if it's Westinghouse.

**Westinghouse Lamp Division, Westinghouse Electric Corporation, Bloomfield, New Jersey**

# ...CHOOSE WESTINGHOUSE LAMPS



**UP TO 60% GREATER USEFUL LIGHT OUTPUT**

Because it directs 60% more light downward than conventional types, the Westinghouse Reflector Fluorescent Lamp is ideal for displays and work areas. Comes in bi-pin and single pin types. The latter can be rotated for precise light control. Built-in reflector cuts maintenance. In 48 and 96 in. sizes; 40 and 90 watts.

**UP TO 20% MORE LIGHT THAN OLDER TYPES**

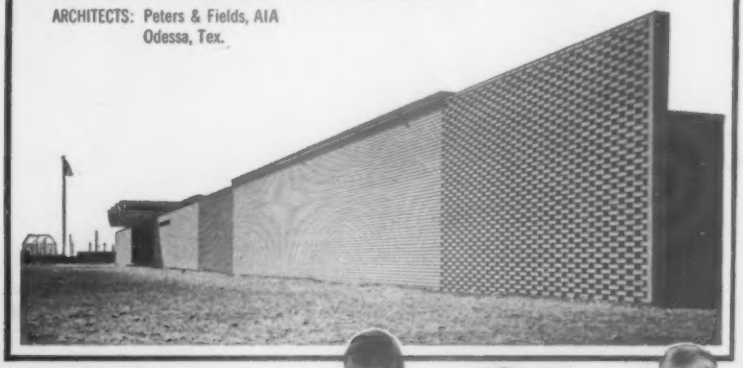
Besides delivering up to 20% more light at the work level, Westinghouse Lifeguard Mercury Lamps maintain up to 86% of initial output after 9,000 hours of use and provide 12,000 hours of high light output. Lifeguard Arc Tube prevents darkening of glass with ensuing loss of light. In the long run, this is the most economical lamp you can buy. In 400, 700 and 1,000 watts.

Westinghouse

# TOP-AWARD WINNING SCHOOL

*John Ireland Elementary School · Odessa, Texas*

ARCHITECTS: Peters & Fields, AIA
Odessa, Tex.



GENERAL CONTRACTOR
W. R. Grimshaw Co.
Odessa, Tex.

MECHANICAL CONTRACTOR
R. W. Gray Plumb'g Co.
Odessa, Tex.

MECHANICAL ENGINEER
Zumwalt & Vinther
Lubbock, Tex.

## ..selects Halsey Taylor fixtures

In the Ninth Annual Competition for Better School Design, conducted by OVERVIEW, a national educational publication, this Texas Elementary School was selected as one of the top award winners. The jury commented: "Appropriate architectural forms, facilities well located and organized."

Of course, Halsey Taylor water coolers and freeze-proof outdoor fixtures were specified. The Halsey Taylor line, embracing low-level, free-standing and the new Wall-Tite and Wall-Mount coolers, as well as cafeteria types and fountains, gives the architect or builder a wide choice.

*The Halsey W. Taylor Co., Warren, Ohio*

This new "All-Climate" type has special all-weather features and proves superior for freeze-proof installations outdoors.

Halsey Taylor coolers are designed to meet the highest hygienic standards and are ideally suited to installations in public buildings. The new Wall-Tite and Wall-Mount series provides the added feature of tight-to-the-wall fit with no exposed fittings and ease of maintenance.

Halsey Taylor®

**ASK FOR LATEST CATALOG, OR SEE SWEET'S OR THE YELLOW PAGES**

340


## FACTORY/EQUIPMENT NEWS

*Begins on page 124*

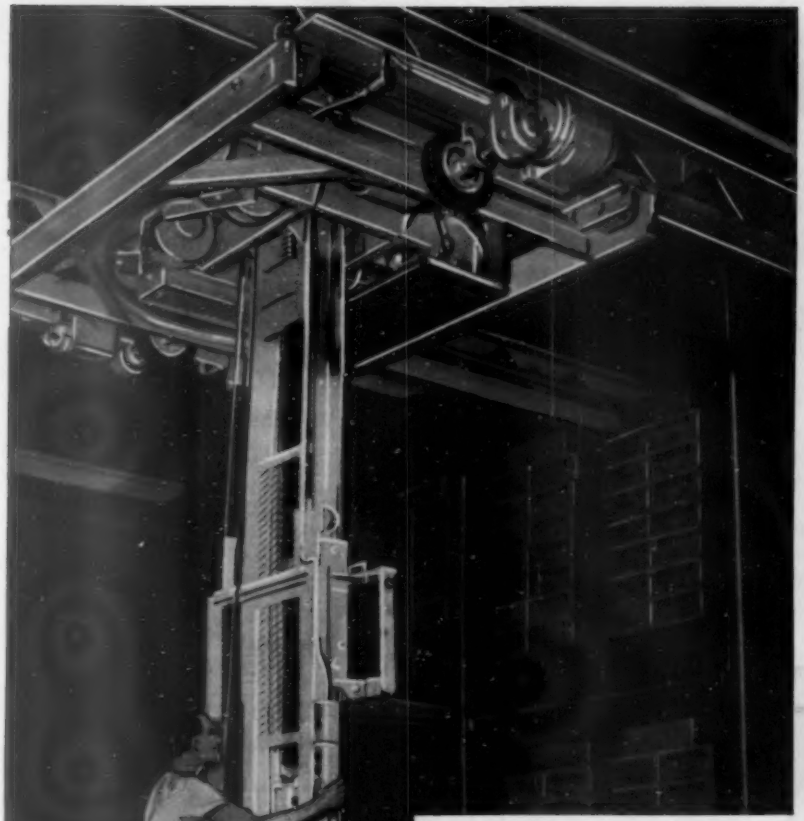
For more about these items, circle item numbers on Reader Service Card next to back cover.

**138—Flow Classifier,** for processing systems with pressure transfer of fluids, permits liquids to pass, but prevents flow of gases. Eliminates pressure blow-back of air or gas. Allows use of air or gas pressure to transfer acids or volatile liquids. *Prenco Mfg. Co.*

**139—Pushbutton Controls** (heavy duty), in three lines, include selector switch units, standard pilot lights, push-to-test pilot lights or lighted pushbuttons. Interchangeable parts, seven safety colors, special contacts that work in all atmospheres. *Clark Controller Co.*

**140—Piv-O-Tray,** a 16-gauge steel pivoting shelf, attaches easily to most machines to hold up to 50 lb. of parts or tools that must be kept close at hand. Raised edges prevent tool travel from vibration. Install singly or in pairs with screw driver. *E. V. Nielsen Inc.*

*Turn the page*



Operator loading Louden Overhead Fork Lift in storage area of nation's leading manufacturer of stapling equipment.

Overhead Fork Lift with loaded pallet is easily turned by the operator.

Operator stores Fork Lift out of the way leaving narrow space-saving aisle free.

# Storage Simplified with Overhead Fork Lift

Engineered to fit the Shipping Area of the Bostitch plant in East Greenwich, R.I., this Louden Materials Handling System simplified storage facilities and provides cost-cutting materials handling. Now, with a much larger inventory being carried, merchandise is stacked three pallets high in less than half the floor area used in a former warehouse. The entire area is serviced by a Louden Overhead Fork Lift.

The revolving fork lift carrier operates on either of two double girder cranes on adjacent runways that span the storage area. Transfer rails allow the carrier to move from one crane to another. Suspended from above, the fork lift has stability in handling, operates in narrow space-saving aisles and maintains the shelves on both sides of the aisles since it can be easily rotated. The operator riding up and down with the movement of the hydraulically operated lift insures careful handling of the merchandise.

When you have a materials handling problem, call on Louden, the pioneer of overhead handling. Benefit by Louden's unequalled experience and broad array of service-proven equipment. Most Louden installations pay for themselves in months; some have done so in a matter of weeks. You can discuss your problem with a Louden field engineer without cost or obligation. Write or wire today.

**THE LOUDEN MACHINERY COMPANY**

905 Broadway, Fairfield, Iowa

*A Subsidiary of Mechanical Handling Systems Inc.*

**Louden**

**MONORAIL & CRANES**

NEW . . . get the latest information on the best in modern materials handling methods. Full of how-to-do-it ideas . . . industry by industry. Write today for your copy of "COST-CUTTING WITH MONORAIL AND CRANES."

**SINCE 1867 . . . THE FIRST NAME IN MATERIALS HANDLING**

For more about these items, circle numbers on Reader Service Card next to back cover.

**141—Electronic Training Device,** 9×12×5 in., simplifies instruction of technicians in transistor uses. Interchangeable diagram templates permit mounting solid state components at indicated positions for assembly of complete operating circuits. *Radio Corp. of America.*

**142—Recordaflux,** a magnetic particle inspection system, provides a permanent record on plastic film of defects such as cracks, inclusions, etc., in metal parts. Solution, containing magnetic particles, is poured or sprayed, then stripped off when hardened (photo). *The Budd Co.*

**143—Automatic Numerical Control** makes punched-tape programing for contouring simple and economical. Slopes and arcs can be machined without detailed, point-to-point instructions. Programs directly from engineering drawings, bypasses computers. *General Electric Co.*

**144—Corrugated Sheet Shear** permits one man to cut steel or aluminum sections to exact length, minimizing scrap and lap. Cuts are clean and burr-free, without distortion. Portable tool has quick-change blades for various corrugated forms. *W. A. Whitney Mfg. Co.*

**145—"Pocketphone"** is two-way 13½-oz. radio that actually fits into pocket. Broadcasts and receives at distances to 1 mile in Citizens' Band. Requires no license to operate. Rechargeable battery lasts one year. Transistorized; costs only $125. *Globe Electronics.*

**146—Drive Tensioner** controls tensioning of chain or belt at any point on 360-deg. arc without changing base. Eliminates shock loading and horsepower loss. Comes in 2-in.-long shaft for single drives, 3- and 4-in. shafts for wider drives. *Brewer Machine & Gear Co.*

*Turn the page*


ASARCO

DISTRIBUTORS for ASARCON CONTINUOUS-CAST BRONZE

**ALABAMA**
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J. M. Tull Metal & Supply Co., Inc.
FAIRFAX 3-1612
**ARKANSAS**
**Little Rock**
Arkansas Foundry Company
FRANKLIN 2-6261
**CALIFORNIA**
**Los Angeles**
Kingwell Bros., Ltd.
LUDLOW 2-7427
**San Francisco**
SUTTER 1-0514
**CONNECTICUT**
**Guilford**
Knapp Foundry Co., Inc.
GLENDALE 3-2744
**Seymour**
The Derby Castings Co.
TUXEDO 8-2581
**Stratford**
The Ellsworth Steel & Supply Co.
EDISON 7-3317
**FLORIDA**
**Jacksonville**
J. M. Tull Metal & Supply Co., Inc.
EVERGREEN 7-5561
**Miami**
J. M. Tull Metal & Supply Co., Inc.
NEWTON 5-0365
**Tampa**
J. M. Tull Metal & Supply Co., Inc.
TAMPA 3-6741
**GEORGIA**
**Atlanta**
J. M. Tull Metal & Supply Co., Inc.
JACKSON 5-3871
**ILLINOIS**
**Chicago**
Bronze Bearings, Inc.
AVENUE 2-2337
Ray M. Ring Co., Inc.
ESTERBROOK 9-0300
**Peoria**
Ray M. Ring Bearing Co.
PEORIA 3-8171
**Rockford**
Rockford Tool & Transmission Co.
ROCKFORD 2-7711
**INDIANA**
**East Chicago**
Ray M. Ring Co., Inc.
E. CHICAGO 9020
SAGINAW 1-8660
**Indianapolis**
W. J. Holliday & Co., Div. of Jones & Laughlin Steel Corp.
MELROSE 1-8311
**South Bend**
Powell Tool Supply, Inc.
ATLANTIC 9-5578
**KENTUCKY**
**Louisville**
Williams & Co., Inc.
JUNIPER 3-7781
**LOUISIANA**
**New Orleans**
Standard Brass & Mfg. Co.
AUDUBON 1381
**Shreveport**
Standard Brass & Mfg. Co.
SHREVEPORT 29483
**MARYLAND**
**Baltimore**
Bronze Specialities, Inc.
LEXINGTON 9-1906
**MASSACHUSETTS**
**Boston**
Kelco Metal Products Co.
HUBBARD 2-1737
**MICHIGAN**
**Detroit**
Copper & Brass Sales, Inc.
FOREST 6-6200
Meier Brass & Aluminum Co.
JORDAN 6-3902
**Grand Rapids**
Copper & Brass Sales, Inc.
EMPIRE 1-5681
**Kalamazoo**
Bard Tool and Equipment Co.
FIRESIDE 3-2691
**Lansing**
Superior Brass & Aluminum Co.
IV 2-2754
**Muskegon**
Towne Hardware & Supply Co.
2-2651
**MINNESOTA**
**Minneapolis**
R. G. Erde, Inc.
FE 8-4846
**MISSOURI**
**Kansas City**
Associated Bearings Co.
VALENTINE 1-5393
Hubbell Metals, Inc.
BALTIMORE 1-7760
**St. Louis**
Hubbell Metals, Inc.
FRANKLIN 1-0212
**NEBRASKA**
**Grand Island**
The Island Supply Co.
DUPONT 2-8567
**Omaha**
T. S. McShane Co., Inc.
JACKSON 1273
**NEW JERSEY**
**Carlstadt**
E. A. Williams & Son
GENEVA 8-0800
MARKET 31929
(New York LA 4-9546)
**Newark**
Federal Foundry Sales, Inc.
MARKET 2-6330
**Perth Amboy**
Gregg's Brass Foundry
HILLCREST 2-2086
**NEW YORK**
**Brooklyn**
Hamsley, Inc.
STERLING 8-1144
**Buffalo**
Kencroft Associates, Inc.
RIVERSIDE 1520
RIVERSIDE 2020
**Rochester**
Ontario Metal Supply, Inc.
HAMILTON 6-1630
**Syracuse**
Meloon Bronze Foundry, Inc.
GLENVIEW 4-3231
**Troy**
The Troy Belting & Supply Co., Inc.
AS 2-4920 (in Albany 3-6121)
**OHIO**
**Akron**
Akron Welding and Spring Co.
JEFFERSON 5-2187
**Cleveland**
Copper & Brass Sales, Inc.
ENDICOTT 1-5757
The Bearing Bronze Casting Co.
MICHIGAN 1-6520
**Cincinnati**
Reliable Castings Corp.
KIRBY 1-2627
**Columbus**
Williams & Co., Inc.
AXMINISTER 4-1623
**Dayton**
The Bristol Brass Corp. of Ohio
FULTON 8185
**Toledo**
The Seager Brass Company
CHERRY 8-5321
Williams & Co., Inc.
GREENWOOD 5-8661
**PENNSYLVANIA**
**Easton**
R. T. Schaller Co.
EASTON 2-2435
**Latrobe**
Latrobe Foundry Machine & Supply Co.
KEYSTONE 7-3341
**Philadelphia**
Brass & Copper Sales, Inc.
GLADSTONE 7-2500
Renewal Service, Inc.
BALDWIN 9-6330
**Pittsburgh**
Pennsylvania Industrial Supplies Co., Inc.
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Pittsburgh Brass Mfg. Co.
ATLANTIC 1-6761
**RHODE ISLAND**
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Clifford Metal Sales Co., Inc.
UNION 1-4100
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**Greenville**
J. M. Tull Metal & Supply Co., Inc.
CEDAR 3-8366
**TENNESSEE**
**Memphis**
Memphis Bearing & Supply Co.
JACKSON 6-7543
**Nashville**
Dixie Bearings, Inc.
CHAPEL 2-7351
**TEXAS**
**Beaumont**
Standard Brass & Mfg. Co.
TERMINAL 3-2641
**Houston**
Standard Brass & Mfg. Co.
CAPITOL 56531
**Port Arthur**
Standard Brass & Mfg. Co.
YUKON 5-9377
**WISCONSIN**
**Milwaukee**
Badger Bearing Co.
BROADWAY 2-0231
**CANADA**
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*Order bearing bronze in any lengths up to 105", diameters up to 9"*

**ASARCON 773 (SAE 660)**
**CONTINUOUS—CAST BRONZE**

Asarcon 773 can cut your replacement bearing costs many ways. Buying only the lengths you need means no short-end scrap. Your choice of diameters up to 9" reduces diameter loss—only 1/32" to 3/32" to machine off. Every Asarcon bar is unconditionally guaranteed to be free of blow holes, pits, or sand inclusions. No shrinks; no hard or soft spots. Better, more uniform properties. Order Asarcon 773 from stock in 260 sizes, solids, and tubes, from a national network of distributors. Write for address of nearest stock point, and complete data, to Continuous-Cast Department, American Smelting and Refining Company, Barber, N. J. or Whiting, Ind.

ASARCO

AMERICAN SMELTING AND REFINING COMPANY

CONTINUOUS CAST DEPARTMENT

West Coast Distributor: Kingwell Bros., Ltd., 457 Minna Street, San Francisco, Calif. In Canada: Federated Metals Canada, Ltd., Toronto and Montreal. Distributors in many principal cities.

**For more facts Circle 458 on Reader Service Card**

# Ease the profit squeeze

## with a PAYLOADER®

***What users say about the H-25:***

**Power and Capacity** — "The most efficient loader we've ever used—outperforming larger loaders. Gives nearly twice the production of our old HA's. Good digging power and traction, fast lifting power." . . . "Before purchasing the H-25 we had competitive demonstrations that proved its production efficiency over other machines."

**Speed and Maneuverability** — The H-25 "is doing a top production job. Power-steer and power-shift combination gives us maximum efficiency from both machine and operator." . . . "Quicker on the lift, dump and go — is more compact, gets into smaller places easier and faster."

**Easy Operating** — "Power steering and no clutch is a must. You can get full loads without spinning wheels and the operator lasts longer too." . . . "I like the maneuverability and work capacity."

**Reliable** — "We find they stand up under tough, rugged duty with minimum repairs." . . . "The low maintenance on the H-25's is way superior to any loader previously used. It's a real producer, easy to service." . . . "Gives maximum production output under ideal or adverse conditions."

**Profitable Performance:** These reports from many owners of the 2500-lb. capacity Model H-25 reflect the kind of outstanding performance that is built into all "PAYLOADER" units. Whatever your material handling problems may be, there is a proper size "PAYLOADER" to do the job more efficiently. There are 20 models in 8 capacity ranges — up to 12,000 lbs. operating capacity — to meet your needs. If you want to "ease the profit squeeze" in your operation, contact your nearby Hough Distributor, or return the coupon for more complete information.

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THE FRANK G. HOUGH CO.
755 Sunnyside Ave.
LIBERTYVILLE, ILLINOIS
SUBSIDIARY — INTERNATIONAL HARVESTER COMPANY

☐ Send H-25 "PAYLOADER" data

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Name _____
Title _____
Company _____
Street _____
City _____
State _____

9-A-5

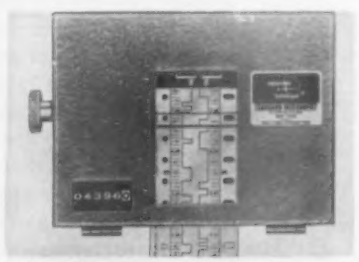

## FACTORY/EQUIPMENT NEWS

*Begins on page 124*

For more about these items, circle item numbers on Reader Service Card next to back cover.

**147—Grinding Wheel,** little larger than a fly's eye, is expected to cut grinding costs sharply in micro-miniature production operations. Eliminates retooling—wheel needs replacing only when worn. Operates at speeds to 40,000 rpm. *Bay State Abrasive Products Co.*

**148—Explosion - Proof Receptacle** has air- and water-tight connection that is not energized until plug is twisted and locked in place. Line includes connectors and distribution blocks for 1, 2 (photo), 4, or 6 plugs. Connections made without tools. *Empire Products, Inc.*

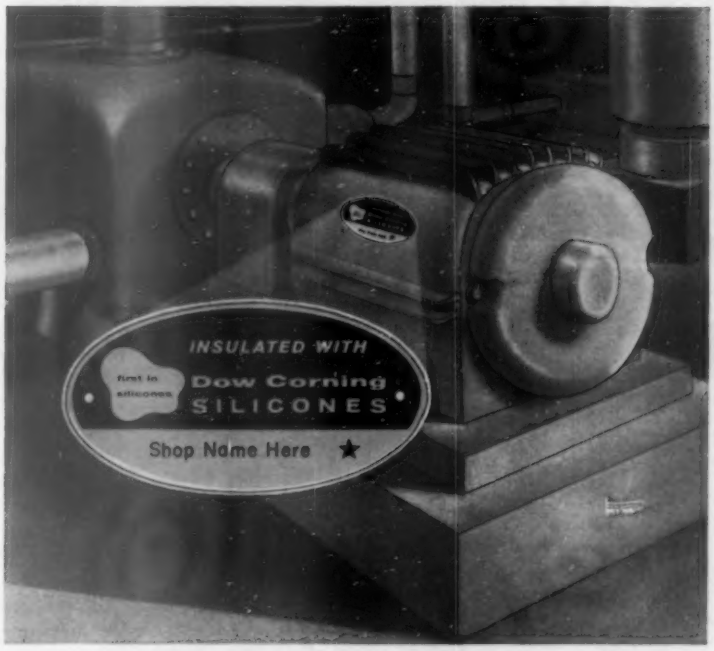


**149—Time Recorder** simultaneously charts, on two channels, operating patterns of two machines or processes, or two functions of same machine. Shows productive and idling time—guides preventive maintenance, cleaning, parts replacement. *Standard Instrument Corp.*

*Turn the page*

**SILICONE NEWS from Dow Corning**

# Better Than New...Cost Less Too




## Silicone Rewinds Provide Extra HP to Handle Increased Loads . . . Overloads

From coast-to-coast, from Canada to the Gulf, nearly 200 Service Shops are now qualified and equipped to rebuild motors from your plant so that they will deliver from 25% to 50% greater horsepower than they did as originally supplied.

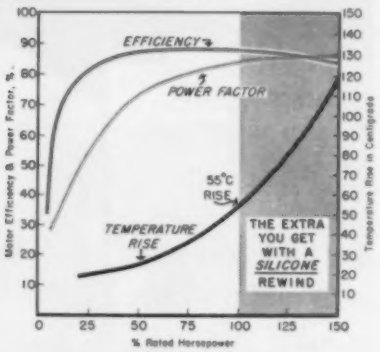
Service Shops identify these motors by affixing brass plates that read "Insulated with Dow Corning Silicones" . . . and bear the shop name.

Where motors in your plant have failed because of increased production schedules . . . a change in processing or machining techniques . . . rapid reversing . . . jogging . . . inching . . . temporary or continuous overloading . . . a silicone rewind is the cost saving solution to minimum downtime and future reliability.

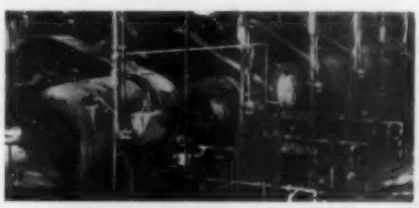
Or if you're planning new processes, new schedules that will increase horsepower requirement of existing motors, consider these facts: Your present motors can be rewound with silicones for a fraction of the price of new motors — and you save the cost of new motor pedestals and mounts, fittings, wiring and controls. Furthermore, you save considerable installation time and expense.

Silicone rewinds give reliable operation in almost any surrounding — regardless of high ambients, moisture, many corrosive atmospheres. For more information, and the name of Authorized Service Shops near you, contact Dow Corning, Dept. 3609.

SERVICE SHOPS identified by this gold emblem are experienced in rebuilding motors . . . in the use of silicone insulating materials to assure top quality performance.




MOTORS REWOUND with Dow Corning Silicones give up to 50% more horsepower. Efficiencies and Power Factors are comparable to those at full load ratings of motors as originally supplied. Only the insulation changes. The extra thermal stability of silicones increases motor capability.



SILICONE REWINDS consistently produce outstanding results such as these: To increase pumping capacity 30%, thirty-one 50 and 60 horsepower pump motors were rewound with silicones — boosting their output from 50 to 75 horsepower, from 60 to 90 horsepower. Total cost was only $19,000 compared to $68,200 for new motors and mounts! After 4 years, the motors have proved 8 times more reliable!

**SPECIFY** Dow Corning Silicones and **SAVE!**

first in silicones

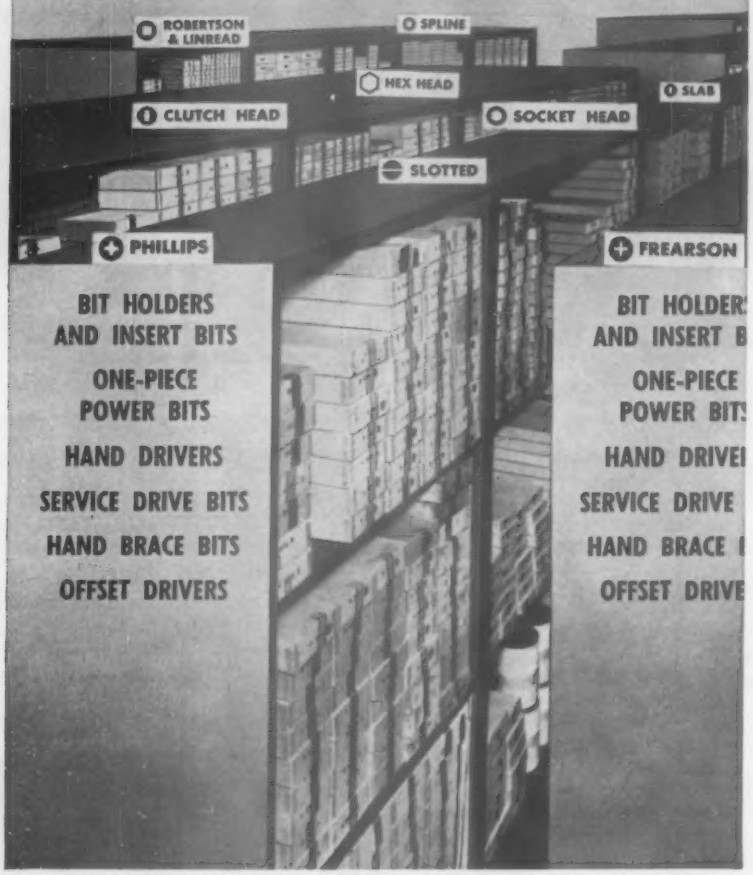
**Dow Corning CORPORATION**
MIDLAND, MICHIGAN

ATLANTA BOSTON CHICAGO CLEVELAND DALLAS LOS ANGELES NEW YORK WASHINGTON, D. C.



For more facts Circle 460 on Reader Service Card

# A COMPLETE TOOL STOCKROOM YOU CAN KEEP ON YOUR DESK!




As quickly as turning a catalog page, you can order out any of the thousands of Apex screwdriving tools in this stockroom. Standard and magnetic tools . . . for all types and sizes of screws . . . for manual or power tool operation . . . they're all clearly listed in our Catalog 30-C.

Prompt delivery on all standard application tools; immediate attention to specials. For emergency rush orders, Apex representatives in most principal cities have a stockroom full of the most used screwdriving tools.

Reduce your tool inventory the safe way by making Apex your screwdriving tool stockroom. Write, on your company letterhead please, for Catalog 30-C.

APEX FASTENING TOOLS

SCREWDRIVING • NUT RUNNING • SPECIAL

The APEX Machine & Tool Co. • 1023 So. Patterson Blvd. • Dayton 2, Ohio

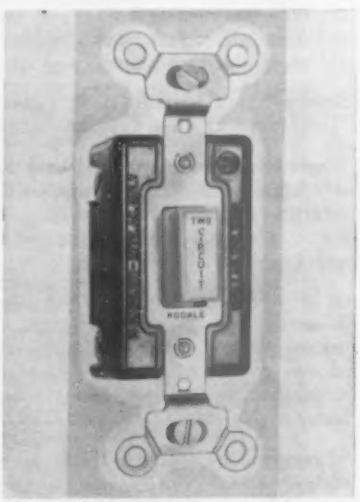

## FACTORY/EQUIPMENT NEWS

*Begins on page 124*

For more about these items, circle item numbers on Reader Service Card next to back cover.

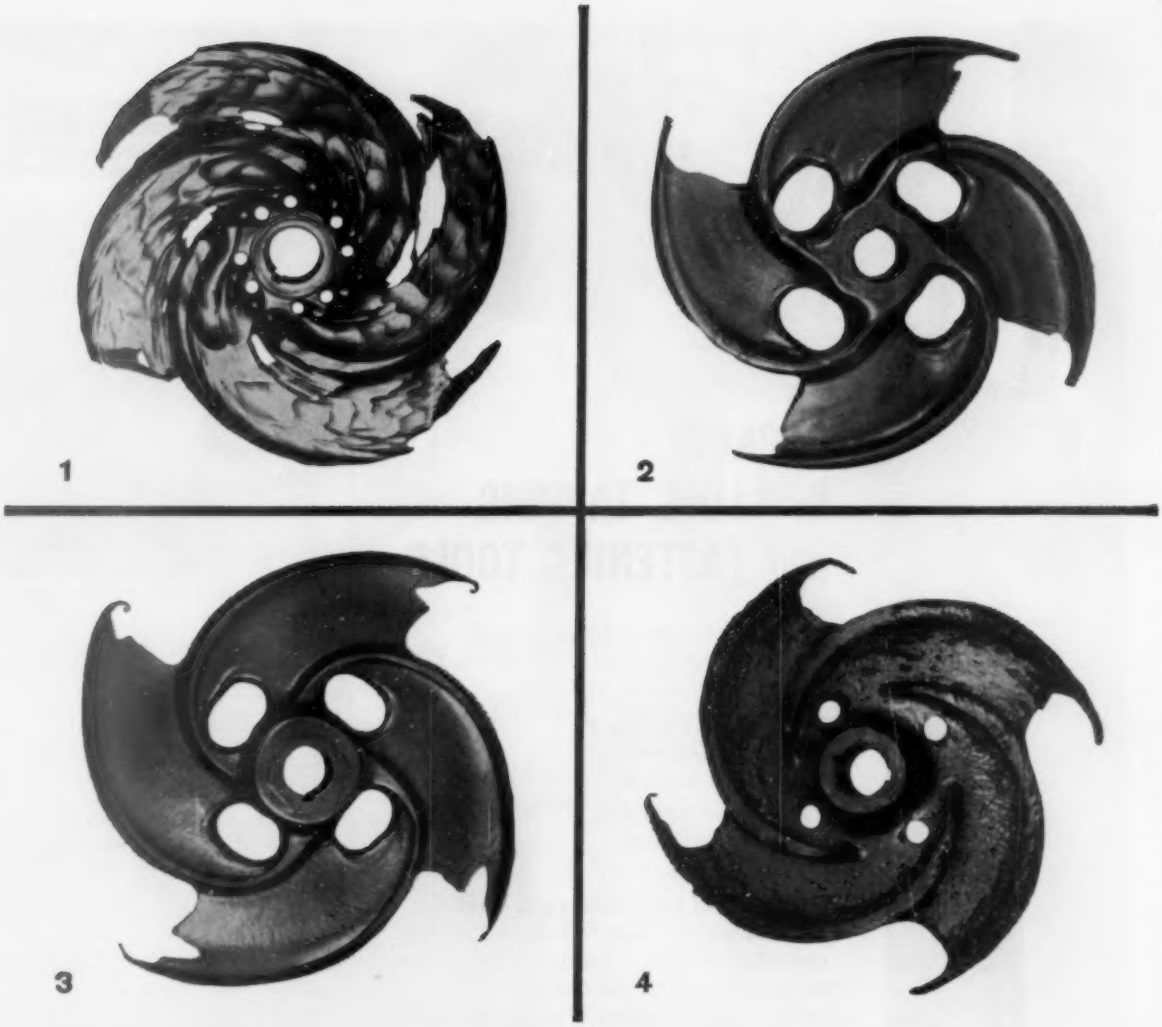
**150—Power Sweeper,** heavy-duty rider-type, is built to withstand severe wear and tear for around-the-clock use. Sweeps 36-in. path at speeds to 6 mph., or up to 100,000 sq. ft. of area per hour. Easy to handle, has 66-in. turning radius. *Clark Floor Machine Co.*

**151—Positioning Valve** can "inch" an air-actuated device to any position, then hold. Solenoid-operated, 3-position, 4-way valve has only three working parts. Comes with ⅜-in. port, closed or open centers, pressures to 150 psi. *Mechanical Air Controls, Inc.*



**152—Light Switch** controls two separate lighting circuits. One touch of switch activates one circuit. At third touch, both circuits make contact for full brightness. Fourth touch breaks contact. Carries 1800 watts at 120 v., 4100 at 277 v. *Rodale Mfg. Co.*

*Turn the page*




# HOW GOOD A PUMP DETECTIVE ARE YOU?

Each impeller above is made of Worthite, an austenitic chromium-nickel-molybdenum stainless steel. Each was selected for its corrosion and abrasive resistance to the fluid being pumped. Each was in a pump correctly selected for the hydraulic problem to be faced. But each wore out long before necessary. Can you tell why by looking at the impellers?

In figure No. 1, the impeller handled lime mud in a paper mill. The deep gouges are caused by large chunks of lime. The feathered edges are caused by churning in the mud at start-up and when the suction tank was almost empty. Agitation of the liquid in the suction tank and by-passing solved the problem.

In figure No. 2, the Worthite impeller handled 65% potash slurry from the bottom of a thickener. It lasted 3 months. The percentage of solids was too high and the pump was operating at too high a capacity. By operating nearer the maximum efficiency and with a slight reduction in solids, the life of the impeller was more than doubled.

In figure No. 3, the impeller handled fine (48 mesh) potash slurry with some sharp sand. The pump flow was controlled by throttling the suction. By eliminating throttling of suction and installing a by-pass, impeller life was increased from one to about four years.

In figure No. 4, the pump delivered 50% by weight slurry to a plate and frame filter press. As the filter filled up, the pump operated back toward shut-off, causing wear on the outer third of the impeller vanes. The solution was to shut the pump down when adequate filter cake had been built up, but before the pump began to operate against shut-off. Impeller life increased three times.

Now, why did the impellers wear out long before necessary? It wasn't impeller material or pump selection. It *was* the system on which the pump was used. Seemingly small factors in installation or operation prevented achieving the full economy promised by Worthite in handling corrosive-abrasive fluids.

At Worthington we have been through these and virtually every other pumping problem. With the answers we've accumulated, we can help you avoid similar situations. For this help, contact your Worthington distributor listed in the yellow pages. Or write Worthington Corporation, Section 20-22, Harrison, N. J.

WORTHINGTON

**For more facts Circle 462 on Reader Service Card**

NOW...low-cost AUTOMATION!

## BUCKEYE DRILLING, TAPPING and FASTENING TOOLS

Cut production costs by employing the features of dependable, air-operated Buckeye Automation Tools:

- Small offset, as close as 1¾″ center distance
- Models from 650 to 22,000 RPM
- Adjustable stroke 0 to 2″ with micrometer accuracy
- Adjustable feed rate
- One type of tool features total stroke of 2″, of which 1″ may be fully hydraulically controlled, preventing break-through damage to material and to sensitive cutting tools . . . also incorporates adjustable rapid approach for minimum cycling time.
- Tool accessories provide signals to control mechanisms which will automatically shut tool off . . . actuate other tools for subsequent operations . . . or automatically position the next part.
- Buckeye engineers will work with you in applying these tools to fit your requirements for drilling, tapping, fastening, grinding, reaming, counterboring and wire brushing.

*write today for descriptive literature, tracing templates and prices*

Buckeye Tools CORPORATION

P.O. BOX 966, DAYTON 1, OHIO

*Pioneering Power Tools for Industry Since 1920*

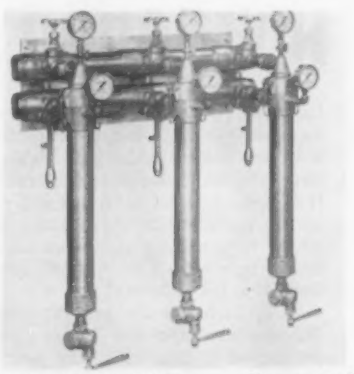

## FACTORY/EQUIPMENT NEWS

*Begins on page 124*

For more about these items, circle item numbers on Reader Service Card next to back cover.

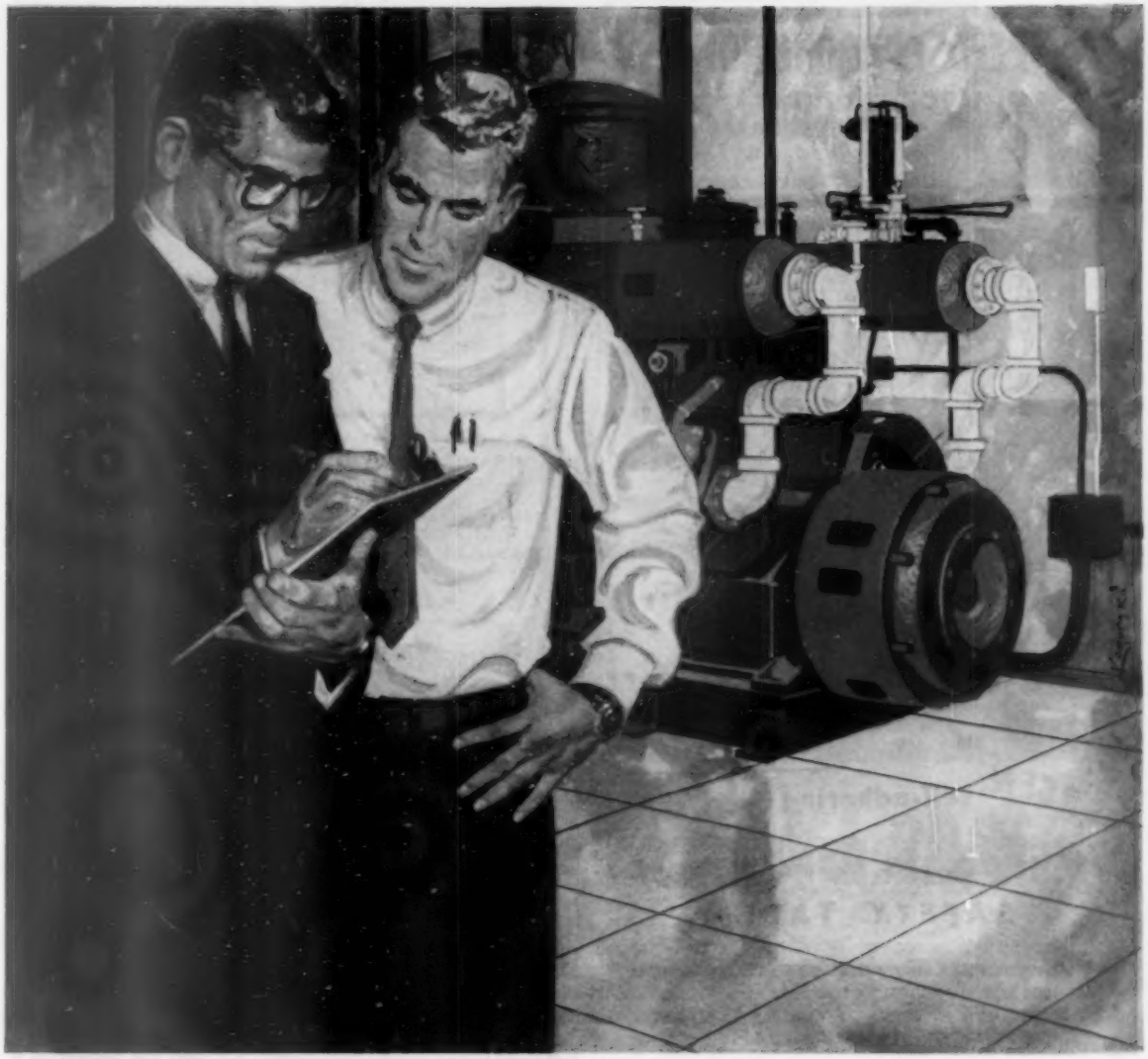
**153—Code Converter** for punched tape permits automatic conversion of 5-, 6-, 7-, or 8-channel tape code systems, one to the other, at 1180 codes per min. Data on 8-channel tape can be wire-transmitted by converting to 5-channel tape, then back again. *Friden, Inc.*

**154—Numerical Control System** uses modular components for quick changes, minimum downtime, and production accuracy to ±0.0002 on 40-in. work table. Automatically controls drill presses, lathes, jig borers, spot welders, assembly machines. *Diehl Mfg. Co.*



**155—Fluid Filters,** wall-mounted in multiples of 2, 3, or 4, are quick-coupled for 1-min. servicing without tools. For hot or cold water, oil, chemicals. Eliminate nozzle plugging, iron and pipe scale. Rate: to 350 gpm., to 200 psi., 450 F. *Ronningen-Petter Co.*

*Turn the page*



# He makes air power earn more than its keep

This man knows how to put air to work. He's the Gardner-Denver Compressed Air Specialist, and every business day he helps plan air power for factory production lines. He consults with plant engineers, helps design new compressed air systems, or helps rejuvenate present air facilities.

After a Gardner-Denver compressed air system has been installed, he returns to these plants because it's his job to help methods engineers get full value from air power. He visits them time and again to see that every cubic foot of capacity earns its keep. And with his expert knowledge of the latest air power applications, he often helps cost committees with cost-saving tips.

If you've recently installed a Gardner-Denver air system, you'll be seeing this specialist soon. If you'd like to see him now, call your nearest Gardner-Denver branch.

EQUIPMENT TODAY FOR THE CHALLENGE OF TOMORROW

**GARDNER - DENVER**

Gardner-Denver Company, Quincy, Illinois
In Canada: Gardner-Denver Company (Canada), Ltd., 14 Curity Avenue, Toronto 16, Ontario



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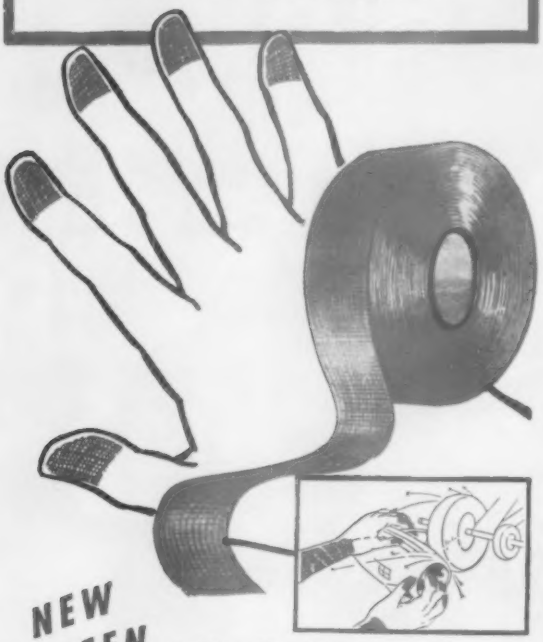
# SPEEDS PRODUCTION REDUCES ACCIDENTS



NEW GREEN self-adhering

# GUARD-TEX

## SAFETY TAPE

- Helps protect fingers, hands, forearms against cuts, burns and abrasions. Reduces eye strain — helps production.
- Promotes safety where potential hazards exist — transformer lamination, pigtailing, handling hot or sharp glass, sanding, polishing, machining, buffing, burring, grinding, punch press operation.
- Self-adhering easy to apply and remove. Conforms neatly to finger contours, without affecting "feel" or flexibility. GUARD-TEX leaves no sticky residue, color stain, or fingerprints. Indispensable in handling delicate work.

GUARD-TEX

**SWEAT BANDS**

**at throw away prices**

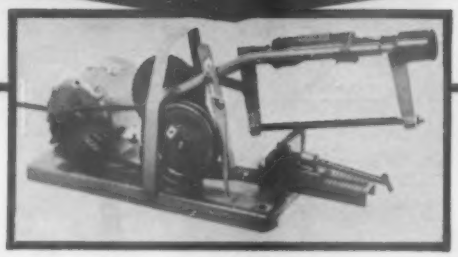
Elastic band holds feather-light, four-ply powerfully absorbent band in just the right place. Comfortable, efficient. Prices and samples free.

**GENERAL BANDAGES, INC.**

8300 Lehigh Ave., Morton Grove, Illinois

158 For more facts Circle 465 on Reader Service Card

# THE "IRON MIKE" PORTABLE POWER HACKSAW



- NOW! GREATLY IMPROVED!
- SAVES YOU TIME ON EVERY JOB!
- CUTS THINNER THAN A DIME!

Now with a new improved base and convenient carrying handle! Weighs only 16 pounds (Less Motor)! Easily carried to any job! Uses ordinary 10" Hacksaw blades! Cuts any metal up to 3½" thick, or pipe up to 4½" OD with vise adapter! Fully automatic, shuts itself off when cut is completed! Amazingly low priced! Satisfaction guaranteed! Thousands in use everyday.

WRITE FOR COMPLETE DETAILS

**ARCO MANUFACTURING CO.**

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# FREE YOUR COPY OF THE NEW ALDEN SYSTEMS HANDBOOK

**At last . . . one place to get the answers to your manufacturing problems . . . whether it's parts handling at the work place . . . setting up a stockroom . . . running a power line . . . lighting a factory . . . operating in less space . . . or setting up an entire production line, you'll find the answer in the ALDEN SYSTEMS HANDBOOK . . . 56 pages packed with money saving ideas on production . . . articles . . . case histories . . . problem solutions . . . cataloging and prices together with the complete ALDEN WORK CENTER SYSTEM STORY.**

***The ALDEN WORK CENTER SYSTEM will cut costs, increase profits and yield more production from less space in your present plant. To "fuse your new plant to the future" it's a must!***

*Write For Your Copy Today To*

**ALDEN SYSTEMS COMPANY**

ALDEN RESEARCH CENTER 9 WASHINGTON STREET WESTBORO, MASS.

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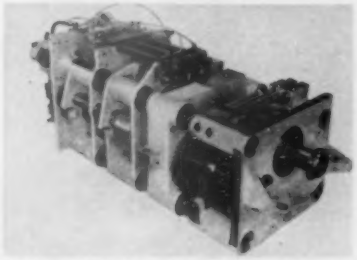
## FACTORY/EQUIPMENT NEWS

*Begins on page 124*

For more about these items, circle item numbers on Reader Service Card next to back cover.



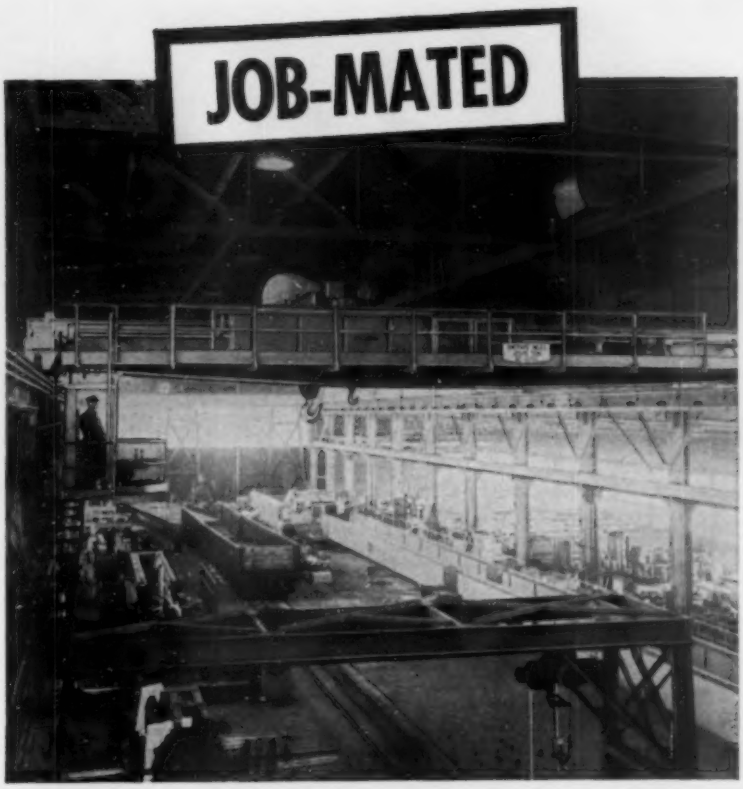
**156—Variable Speed Drive** provides stepless speed controlled by single dial. Drive delivers constant hp. at output speeds from 112 to 1550 rpm. from standard motor speeds for wide range of applications. Built-in overload device. Little maintenance. *Bullard Co.*

**157—Tube Support Bracket** can be made to hold different-sized tubes (½ to 1½ in. OD.) by using rubber bushings with proper ID. Consists of two clamp halves with series of half-round holes. Easily assembled with set-screw wrench. *Thunderbird Industrial Equipment Co.*

**158—Intercom System** provides two-way communication over plant power lines (a-c or d-c). Free from transmission noise and outside interference. Has 1-mile range. Requires no FCC license. Particularly adapted for crane operator contact. *Union Switch & Signal.*

**159—Condenser Tube Cleaner,** for lightly scaled tubes to 1-in. dia., weighs 4½ lb. Air motor operates on 90 psi. at 2200 rpm. Has built-in flushing system to keep drill head cool and remove cuttings. Comes with many cleaning heads. Low-priced. *Airetool Mfg. Co.*

*Turn the page*


# Make room for PROFITS

Effective production and storage space is increased . . . lifting, conveying and stacking are done more quickly and cheaply, with fewer men . . . and re-handling is eliminated—when your plant is equipped with a rugged, dependable, **"Job-Mated"** crane by Shepard Niles.

Shepard Niles Cranes are supplied with the exact combination of capacity, clearance, speed and controls you need to assure more efficient and profitable plant operation. Whichever one best meets your precise job conditions, it will be built to the same high quality standards that have made Shepard Niles America's largest, most relied upon, manufacturer of hoists and cranes.

Why not get the full story on the complete line of **"Job-Mated"** cranes by Shepard Niles. Ask to have a Shepard Niles representative call at your convenience, and send for our descriptive bulletin.

**Makers of cranes from 500 lbs. to 500 tons**

SHEPARD NILES
CRANE AND HOIST CORPORATION

**3307 Schuyler Ave., Montour Falls, N.Y., U.S.A.**

**For more facts Circle 468 on Reader Service Card**

Here you see 9 of 16 Toledos that guard quality at weighing points in the Drug and Chemical Department of Parke, Davis & Company in Detroit. Toledo Bench, Portable and Laboratory Fan Scales do pre-batch weighing . . . then ingredients move on for final mixing and blending.

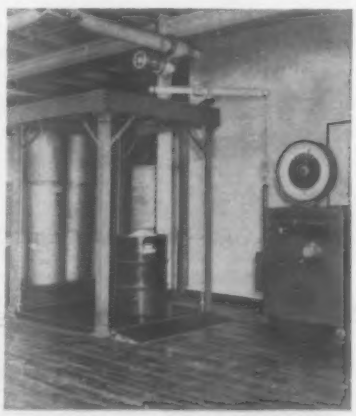
# TOLEDO SCALES

## meet PARKE, DAVIS & COMPANY'S *Critical Standards . . .*

Parke, Davis & Company brings to doctors and patients wonders in the world of medicine . . . products that help extend the span of human life . . . alleviate suffering . . . and thwart sickness and disease. It's a 94-year tradition at Parke, Davis & Company to keep going forward — in research and in methods and equipment used in their laboratories.

You'll see evidence of this company's progress in the choice of modern Toledos for fast, accurate control at weighing points. Putting Toledos in these vital jobs of weight-control assures that right amounts of drugs and chemicals go into each carefully determined formula — every time!

Let us show you how modern Toledos will fit your needs equally well — whatever your weighing problem. Write today for new Condensed Catalog 2001.



● Toledo Model 2282 Suspended Platform Scale weighs drug materials going into batches in the Crude Drug Milling Section of the Extract Department.

TOLEDO SCALE, TOLEDO 12, OHIO
Division of TOLEDO SCALE CORPORATION
(Toledo Scale Company of Canada, Ltd., Windsor, Ont.)

SERVICE Factory-Trained 246 Cities

TOLEDO®

*Weight-printing Scales • Motor Truck Scales • Automatic Batch Controls • Bulk Weighers • Automatic Check Weighers • Electronic Load Cell Scales • Counting Scales • Mailing and Parcel Post Scales*

*Headquarters for Weighing Systems*

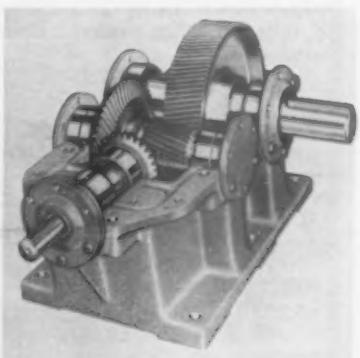

## FACTORY/EQUIPMENT NEWS

*Begins on page 124*

For more about these items, circle item numbers on Reader Service Card next to back cover.

**160—Magnetic Holder** can be attached to portable lights and sockets to mount light source on any exposed steel surface. Has 60-lb. holding power onto ⅛-in. steel on "straight pull" or "lift". Double-jointed clamp assembly is adjustable. *Daniel Woodhead Co.*

**161—Temperature Detectors** come in three types. One measures heat to 1500 F. up to 300 psi.; second measures compressed air discharge temperatures to 5000 psi.; third, explosion-proof, measures bearing temperatures in hazardous locations. *McGraw-Edison Co.*



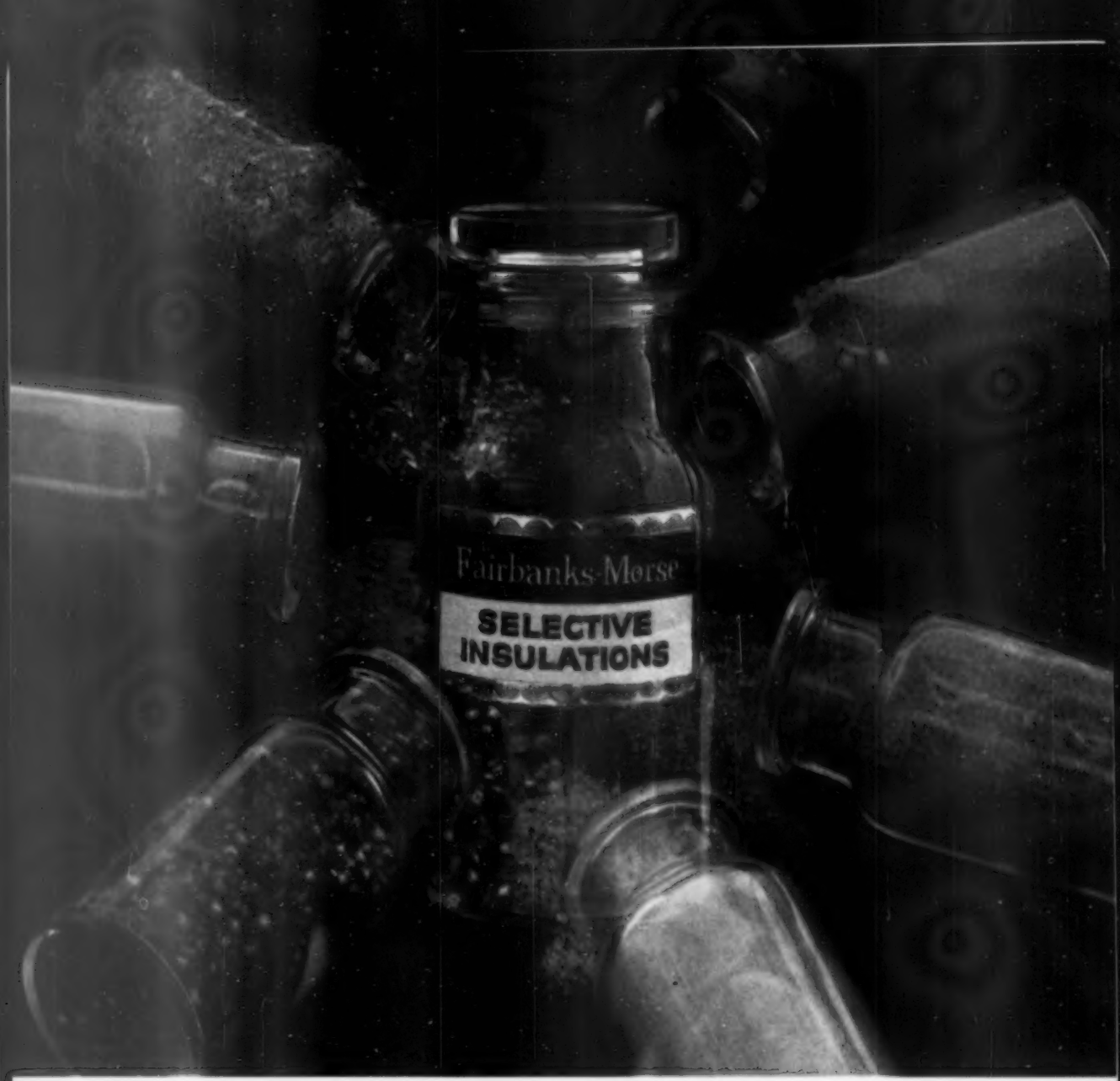
**162—Speed Reducer** line, with spiral bevel gears, saves floor space. Right-angle shaft permits placing prime mover alongside driven equipment. Efficient design allows use of small motors, with energy loss of only 2% for single reduction. *Hewitt-Robins, Inc.*

*Turn to page 164*



For more facts Circle 469 on Reader Service Card

For more facts Circle 470 on Reader Service Card ➤




# The magic of our ingredients makes electric motors better...

Just as a good chef wouldn't use only one all-purpose spice to make a specialty...we don't make an electric motor with one all-purpose insulation.

We build motors with SELECTIVE INSULATIONS...

SELECTIVE INSULATIONS are the magic ingredients that make the difference between merely good motors—and the famous dependability, low maintenance, uninterrupted productivity, and prolonged service of Fairbanks-Morse electric motors.

We actually "tailor" a wide range of insulating materials and processes to motor applications, according to specific operating conditions. We never standardize to the average.

SELECTIVE INSULATIONS meet emergency overloads, temperature extremes, corrosive atmospheres.

We select, test, treat, and prepare insulating materials for the motor... and the job.

We build electric motors that are insulated, rated, and dimensioned to furnish unfailing power—for any purpose.

The magic of our ingredients makes a Fairbanks-Morse electric motor better... and a better buy.

**WHAT DO YOU NEED IN A MOTOR?**

1 h.p. to 10,000 h.p.... open or weather-protected... vertical or horizontal... synchronous or induction ... AC or DC... we'll build it—and build it to last! Write: Fairbanks, Morse & Co., Freeport, Illinois, for full information.

## Fairbanks, Morse

ELECTRICAL DIVISION

A MAJOR INDUSTRIAL COMPONENT OF
**FAIRBANKS WHITNEY CORPORATION**

# TO BE SAFE! A good part of C-20

## Safety Frame protection lies in its smart looks

Workers will wear it, not tuck it in a pocket. Rich brown plastic top rims provide smart brow accent, with the same plastic continued in the temples, spatula or cable, for added style and comfort.

But don't let C-20's looks fool you! Clearly identified as a safety frame by its cross-shaped plaques, it's as tough as they come. The nickel-silver front, with extra strength built into the critical bridge and endpiece areas, provides the maximum in frontal protection. Sturdy deep-grooved eyewires completely encircle lenses to hold them securely. Redy-Fit side shields are easily attached to modify C-20 for additional protection.

Here are all the features you and your workers want in a safety frame: smart neat appearance, long-wearing comfort, superior fitting qualities, unequalled strength, outstanding protection. To see samples, call your B&L supplier, or write: Bausch & Lomb, 90109 Lomb Park, Rochester 2, New York.

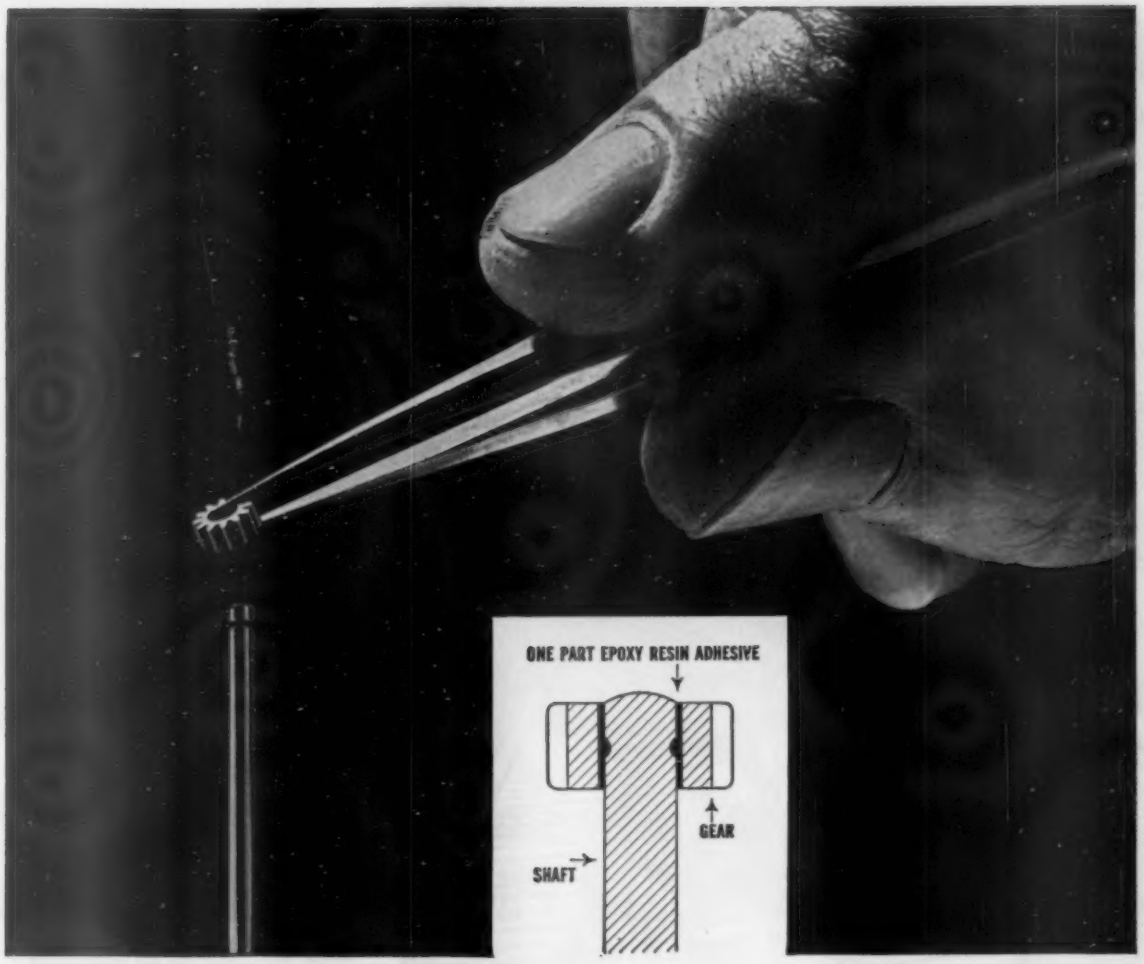
BAUSCH & LOMB

**Protection PLUS Safety Products**

**protection + economy + worker acceptance**



For more facts circle 471 on Reader Service Card




# How fabricating with SCOTCH-WELD® BRAND Structural Adhesives eliminated 100% inspection step

Timing components now being fabricated with SCOTCH-WELD Adhesive EC-1386 meet precise specifications. The Haydon Division, General Time Corp., Torrington, Conn., is using this one-part epoxy resin base adhesive to bond small pinion gears to rotor shafts in a sub-assembly timing gear operation.

Prior to use of EC-1386, the parts were joined by brazing. But the high heat required affected the material hardness. It also produced shaft distortion, necessitating a 100% inspection step.

Then SCOTCH-WELD Adhesive EC-1386 was used. The high heat previously required was eliminated. With the end of this trouble source, shaft concentricity and material hardness were left unaffected, the 100% inspection eliminated. Close tolerance requirements between shaft and gear were also eliminated because of void-filling properties of the adhesive. A savings of $56.37 per thousand assemblies resulted.

Company after company is discovering how to save money, speed production and eliminate rejects by using SCOTCH-WELD Structural Adhesives in the fabrication of their products. Perhaps these adhesives are at work right now in operations similar to yours. Find out! For free literature without obligation, write today on your company letterhead to: AC&S Division, 3M Company, Dept. SBFF-90, St. Paul 6, Minnesota. "SCOTCH-WELD" is a Reg. T.M. of 3M Co.

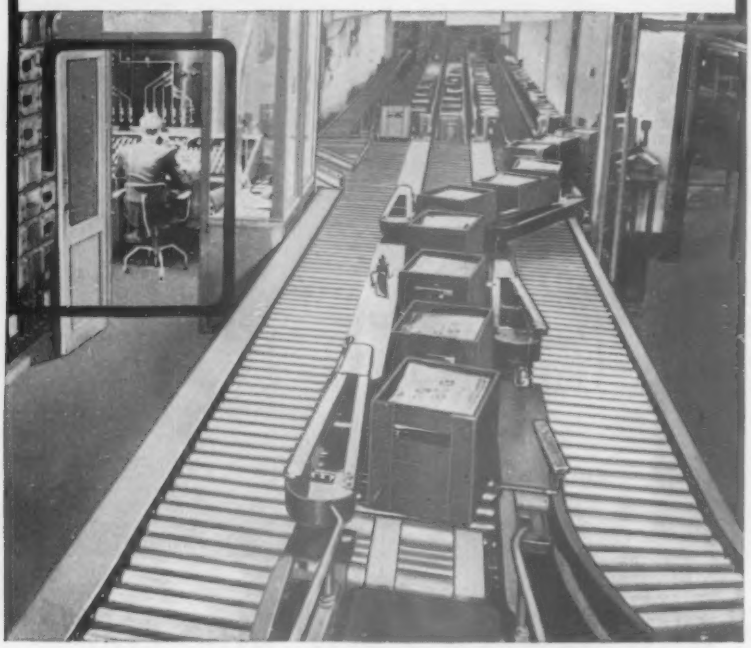
ADHESIVES, COATINGS AND SEALERS DIVISION

**MINNESOTA MINING AND MANUFACTURING COMPANY**

**...WHERE RESEARCH IS THE KEY TO TOMORROW**

3M COMPANY

# 1 MAN ALONE
## OPERATES PLANTWIDE
## A-F ENGINEERED
## CONVEYING SYSTEM



Just 1 man, sitting at the control panel shown above automatically controls the *starting* and *stopping* of *all* or *part* of this A-F Engineered Completely Co-ordinated Conveying System. He also routes and switches "trains" of cases on 5 A-F Conveyor lines to 2 groups of loading docks . . . Cases are automatically counted as they are being moved . . . Visible and audible signals prevent traffic jams . . . Before you order any type of conveyor, better write us. We'll be glad to submit an estimate.

A-F

YOU CAN SEE
THE SUPERIORITY OF
A-F CONVEYOR ENGINEERING

**A-F *Engineered* Conveyors**
Custom Engineered Conveying Systems
Pre-Engineered Conveyors—Wheel, Trolley
Metal Cleaning and Processing Machines

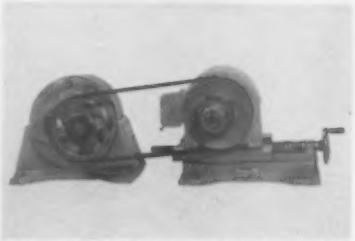
**THE ALVEY-FERGUSON CO.,** 133 Disney Street, CINCINNATI 9, OHIO and Azusa, Cal.

For more facts Circle 473 on Reader Service Card


## FACTORY/EQUIPMENT NEWS

*Begins on page 124*

For more about these items, circle item numbers on Reader Service Card next to back cover.



**163—Variable Speed Drive,** with helical gear reducer (3:1), provides variable speeds between 431 and 24 rpm. For use with ¾-, 1-, 1½-, 2- and 3-hp. motors. Optimount consists of standard components, including adjustable motor base. *Boston Gear Works.*

**164—Micrometer,** with remote head, measures to 10 millionths of an in. on digital read-out counter. Head exerts little pressure on work; can be remotely zeroed in at any point in its 1-in. measuring range. Cable to control console can be any length. *J. W. Dice Co.*

**165—Air Heaters,** electric or gas-fired, have temperature ranges from 450 to 1250 F. Package includes non-overloading, backward-blade 11,766-cfm. blower, heat controller, electronic flame safety device, built-in dampers, flame observation ports. *Grieve-Hendry Co.*

*Turn the page*

Better products, *faster*, from your Bearing Specialist:

# Where the job assignment calls for accuracy in ball bearings, make all replacements with BCA

**Top quality ball bearings easily identified by the red and white keystone on the box**

When the job calls for new ball bearings, skilled maintenance men call for BCA. They know it pays to rebuild accuracy into the job the first time. And BCA quality bearings can eliminate costly replacements and accompanying downtime.

Reasons for BCA preference are many. Most important is uniformity of size, the end result of precision-engineering accuracy coupled with quality control throughout production processes.

BCA stocks are complete in the widest range of sizes and bearing styles to fit every need. Your Bearing Specialist who features the BCA line is ready to assist you on any bearing problem. Just call him.

## BCA BALL BEARINGS

BCA

FEDERAL-MOGUL SERVICE

DIVISION OF FEDERAL-MOGUL-BOWER BEARINGS, INC. • DETROIT 13, MICHIGAN



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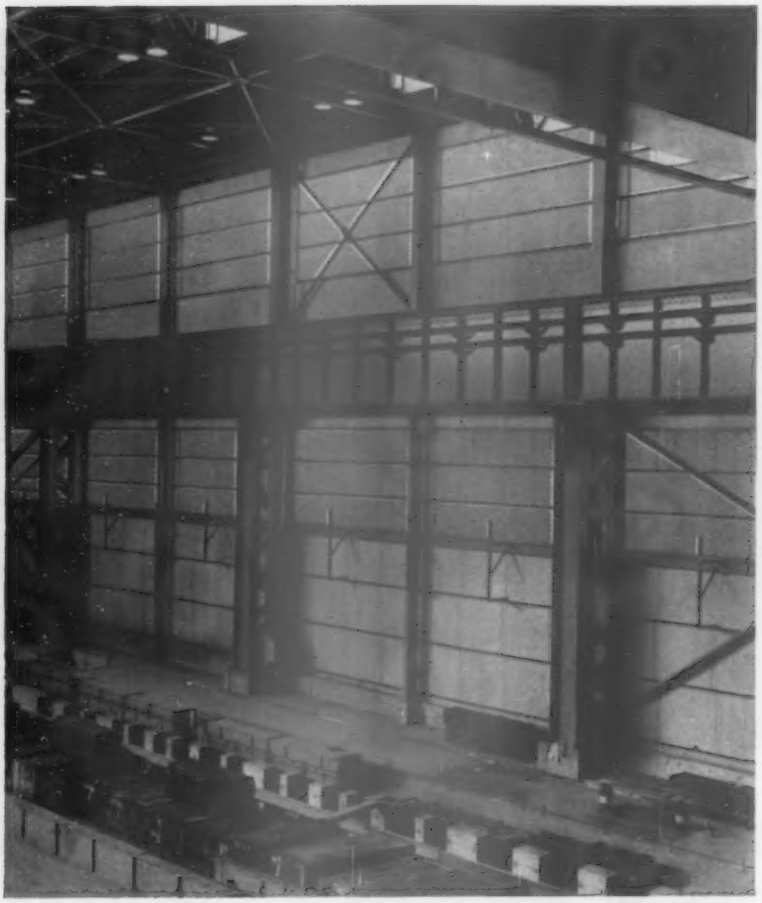

# Shatterproof Structoglas cuts building and maintenance costs for USS United States Steel

United States Steel saved on construction expense and assured years of maintenance-free daylighting by using Structoglas fiberglass windows in this new vertical furnace building. The strong corrugated plastic panels were fastened directly to the steel walls without sash. No painting was required since the light-filtering green tint is "built in." Structoglas is shatterproof and highly weather resistant, so that maintenance is virtually eliminated. Glaze your plant *once and for all* with Structoglas—best plastic panel under the sun. Get the PROOF.*

structoglas®

*Write Structoglas Inc., Dept. 903, Cleveland 20, Ohio, for Glazing Folder SL-1, with proofs of Structoglas superiority and glazing details.

GUARANTEED FOR 3 YEARS against defects, peeling, surface chalking and stress under conditions specified

6007


## FACTORY/EQUIPMENT NEWS

*Begins on page 124*

For more about these items, circle item numbers on Reader Service Card next to back cover.

**166 — Stroboscopic Tachometer,** small and portable, gives off brilliant white flash of 1 to 6 microseconds duration at 110 to 25,000 rpm. Rotating machine parts can be observed at stop point or in slow motion. Machine under test is unaffected. *General Radio Co.*

**167—Ultrasonic Welder** seals or welds plastic films and synthetic fabrics. Also cold-bonds and stitches without thread. High-frequency sound (40,000 cps.) fed through transducer causes exposed molecules of material to interlock. *Ultrasonic Industries, Inc.*

**168—Mobile Incinerator** permits combustion of waste materials with no offensive and irritating smoke and odors. Disperses colorless and odorless gases into air. Reclaims materials such as copper wire by burning off insulation. Moves by crane. *Trio Process Corp.*

*Turn the page*

## Don't bust a blood vessel

# Use the New TELECRANE®

# FM Carrier Communication System

If it's necessary to whistle, shout or wave arms to communicate with crane and equipment operators in your plant, you're flirting with accidents, encouraging work lags, and inefficient operations. You can avoid them all with a system of direct, two-way voice communications.

Union Switch & Signal offers this system at a surprising low cost. The basic equipment includes transmitter-receiver units, loudspeakers, and microphones, and there is a full line of accessories to provide complete flexibility in design. Your own plant electricians can install the system—it uses existing electrical circuits. The system is easy to use—no special training needed. There's no transmission noise or outside interference—voice comes through loud and clear, and there's lots of audio power for your noisiest location.

Union Switch & Signal Carrier Type communication systems are used extensively in steel, railroad, and mining operations. The equipment is rugged and dependable, and uses the very latest and best developments in electronic circuitry. Don't miss this chance to improve your operation. Check the coupon.

**Visit our Booth 487 at the Iron & Steel Exposition, Cleveland Auditorium, Sept. 27-30, 1960**

*"Pioneers in Push-Button Science"*

**UNION SWITCH & SIGNAL**
DIVISION OF WESTINGHOUSE AIR BRAKE COMPANY
PITTSBURGH 18, PENNSYLVANIA

**Union Switch & Signal**
**Division of Westinghouse Air Brake Company**
**Pittsburgh 18, Pennsylvania**

☐ Please send literature about Telecrane

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Name_____

Title_____

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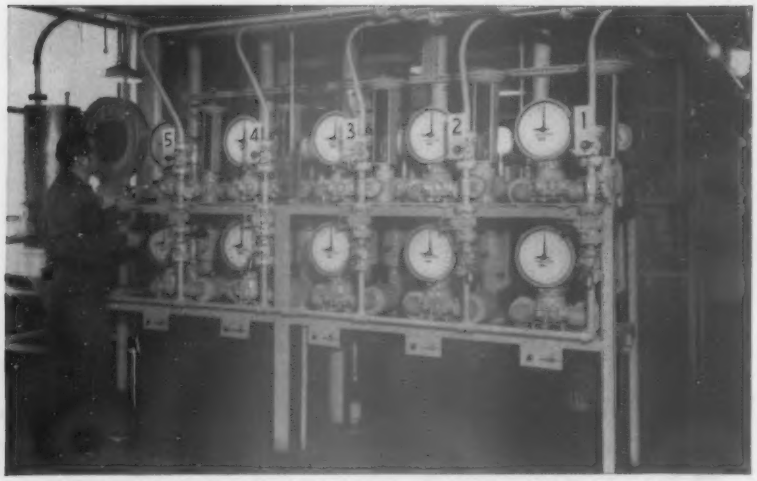
City_____ Zone____ State_____



Battery of Niagara Chemical Meters measuring and controlling flow of $CS_2$ at Dupont's Buffalo Film Department Plant.

# NIAGARA METERS
## *Contribute to the Quality of* DuPont CELLOPHANE

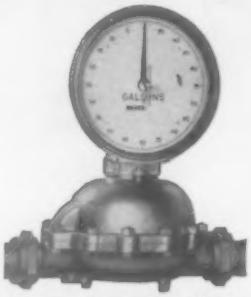
*Quality Control begins with Accurate Measurement of Components*

Wherever liquids are moved, processed or consumed, Niagara Meters can perform the double function of accurate measurement plus control. The flow of liquid can be stopped after a preset gallonage has been measured . . . other control mechanisms can be actuated . . . pump motors can be shut off . . . audible or visual signals can be transmitted to the operator.

Niagara Meters measure liquids volumetrically by the simple (only one moving part in the measuring chamber) displacement method that assures constant accuracy. Whatever the liquid, whatever the function, there is a Niagara Meter that will do the job.

For a complete description of Niagara Chemical Meters, including High Pressure, Steam-Jacketed, and Electricontact Models, write for Bulletin 43.

**BUFFALO METER COMPANY**
**INCORPORATED**
Subsidiary of American Meter Company, Inc.
2887 MAIN STREET • BUFFALO 14, N. Y.



Niagara Electricontact Meter. Available for all types of liquids.

Niagara High Pressure Meter. For pressures up to 5000 psi.

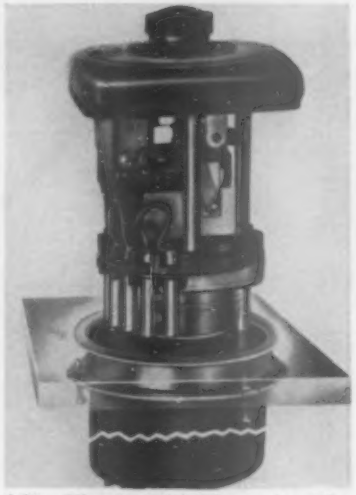
Niagara Steam Jacketed Meter for materials requiring steam heat to maintain fluid condition.




## FACTORY/EQUIPMENT NEWS

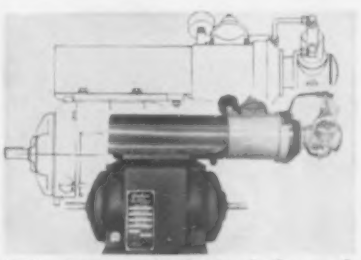
*Begins on page 124*

For more about these items, circle item numbers on Reader Service Card next to back cover.



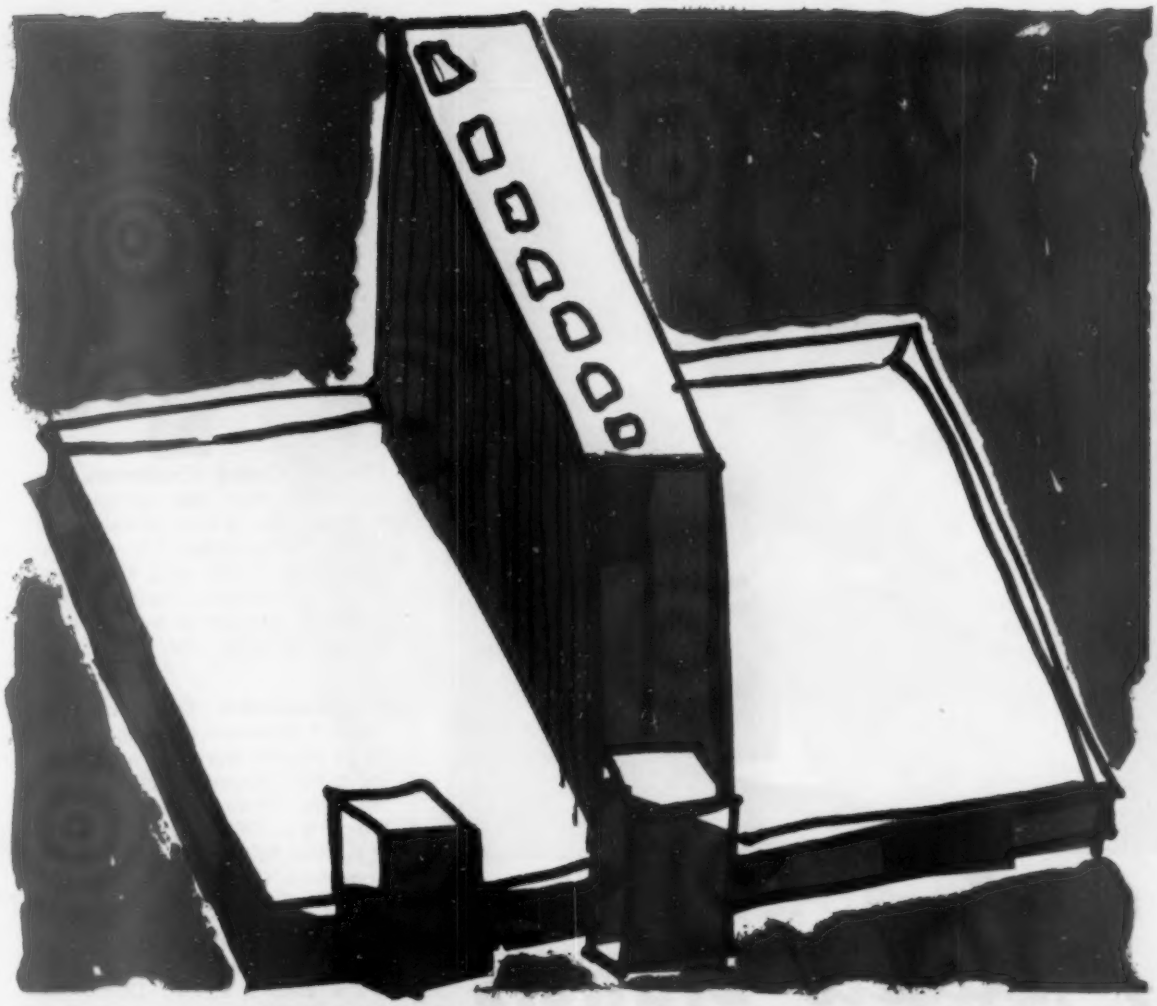
**169—Plug-In Dial Timer** simplifies replacement and critical control in any plant timing operation. Corrosion-resistant. Kit converts installed timers into plug-in units. For a-c or d-c operation, dial ranges from 15 sec. to 60 hours. *Automatic Timing & Controls, Inc.*

**170—Two-Rate Rectifier Charger** supplies d-c to quickly charge or trickle-charge stand-by batteries. Can be used with 6- to 60-cell batteries. Wall-mounted, single-phase, 110 or 220 v., with meter. Manual high-low switch on front panel. *Electric Storage Battery Co.*



**171—Pneumatic Control,** for variable speed transmission, uses 3 to 15 psi. to produce fast, accurate speeds from maximum to 0. Speed is set manually, or automatically with transducers. Transmission uses variety of motors and built-in reducers. *Graham Transmissions Inc.*

*Turn the page*



# TENKOTE ALUMINUM COATING RESTORES ROOF OF CHINA PLANT

Impressive landmark in Newell, W.Va., the soaring Knowles china plant has a capacity of over 10,000 dozens of dinnerware a day. For maximum insulation and weatherproof protection, The Edward M. Knowles China Company recently restored roof surfaces with Tenkote Aluminum Coating, made with ALCOA® Pigments.

Investment in material and labor was modest. One application of Tenkote saved a deteriorating surface, sealed cracks and small holes, heightened appearance.

Aluminum coatings like Tenkote are preferred protection today on hundreds of public and industrial buildings. Here's why. Maintenance experts have found that one coat seals any surface —metal, masonry, composition—with a moistureproof shield that won't sag or run in summer or crack in winter.

Interiors are cooler because the reflective aluminum surface turns back 70 per cent of the sun's radiant heat. Applied with ordinary roofing brush or heavy-duty spray equipment, these coatings come ready mixed . . . require no thinning or heating.

What's the condition of *your* plant roof today? A good fibrated aluminum coating like Tenkote will restore like-new appearance, weatherproof your property for years.

**ALCOA does not make aluminum roof coatings,** but we will be happy to refer you to manufacturers who do. Please send the coupon for our booklets.

**Shown here is The Edwin M. Knowles China Co., Newell, W.Va., weatherproofed with Tenkote Aluminum Roof Coating, a product of American Asbestos Products Co., Cleveland, Ohio.**

For exciting drama watch "Alcoa Presents" every Tuesday, ABC-TV, and "Alcoa Theatre" alternate Mondays, NBC-TV

Aluminum Company of America
1739-J Alcoa Building, Pittsburgh 19, Pa.

Please send your free booklets:

- ☐ *Painting With Aluminum*
- ☐ *Aluminum Roof Coatings Make Time Stand Still*

Name_____

Company_____

Address_____

City_____ Zone____ State_____

**ALCOA ALUMINUM**

PIGMENTS, PASTES AND POWDERS



**For more facts Circle 478 on Reader Service Card**

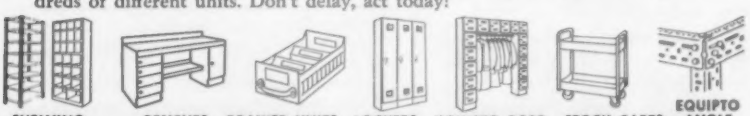
# Equipto Drawers

## now in all sizes

The vast and varied Equipto line offers the widest selection of capacities and combinations ever built into drawer storage units. They include everything from simple 2 drawer units to the large 7' high multi-drawer combination shown above. They are of heavy duty construction and not to be confused with other units on the market. Different types of interchangeable drawers permit thousands of arrangements within the units to satisfy your needs — up to 6,184 drawer compartments in only 3 sq. ft. of floor space.

Some of the drawers are shallow for tiny parts . . . others are Jumbo size for large objects. Up to (17" long by 11¼" wide by 6¼" deep) All have adjustable dividers that lock in place — can't creep up — small parts cannot get from one compartment to another. Heavy gauge steel construction protects parts . . . prevents sagging or sticking . . . prolongs life of units.

Equipto is the most complete line of drawer and drawer units on the market. Send for your free copy of big 32 page drawer catalog No. 302 showing hundreds of different units. Don't delay, act today!



SHELVING BENCHES DRAWER UNITS LOCKERS EQUIPTO ROBE STOCK CARTS EQUIPTO ANGLE

Equipto

812 Prairie Avenue
Aurora, Illinois


## FACTORY / EQUIPMENT NEWS

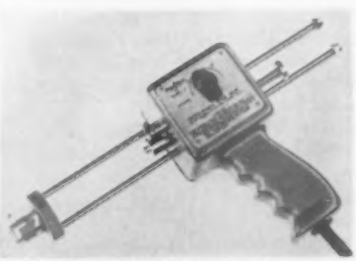
*Begins on page 124*

For more about these items, circle item numbers on Reader Service Card next to back cover.

**172—Air Cooled Condensers,** for air conditioning and refrigeration systems, come in 8- to 85-ton single units or in multiples. Quiet operation results from rigid steel construction. Automatic controls adjust condenser capacity to weather conditions. *McQuay, Inc.*

**173—Immersible Transducer,** for use with ultrasonic cleaning system, fits all present degreasing and cleaning tanks. Magnetostrictive, it has long life although operating continuously at 300 F. System operates at 22 kc.; low noise level. *Harris Transducer Corp.*

**174—Hygrometer** is accurate, extremely sensitive, and registers within 2% even at 230 F. Durotherm does not require regeneration in moist air. Round, silvered, 5-in.-dia. metal dial has readings in increments of 1%. Over-all size 6 in. *Edroy Products Co.*



**175—Arc Spot-Weld Gun** has automatic time control to insure uniform and consistent welds from one side without back-up. Only 2 lb., it welds 14-gage mild, galvanized, and stainless steel to any thickness. Uses no triggers or buttons during weld. *Bren Weld Corp.*

*Turn the page*

# Eye Accidents Cut 92%, Compensation Ins. Costs Cut 51% at CPC Engineering with AO Protection Program

CPC ENGINEERING CORP., Sturbridge, Mass., fabricators of steel, aluminum, stainless steel components and pressure vessels, is another company that KNOWS eye protection pays off. Before installing an AO prevention program, eye injuries in this young, growth company were 120 per year and workmen's compensation insurance premiums $12,000. Currently eye injuries are ten per year and premiums are $5,800. The hours saved by the program are an additional advantage.

Another user of AO eye protection equipment, one of America's largest companies (a company that has prevented 51,000 eye accidents and saved $453,000 in 13 years) puts it this way: "The potential loss of an eye from the hazards of a work operation is the basic justification of an eye protection program. The additional potential dollar savings in medical and compensation costs and time per employee protected per year indicate that the program is self-supporting."*

*Records indicate an AO eye protection program can pay for itself in less than 6 months. Write for new booklet, "Eyes Are Expensive Targets".

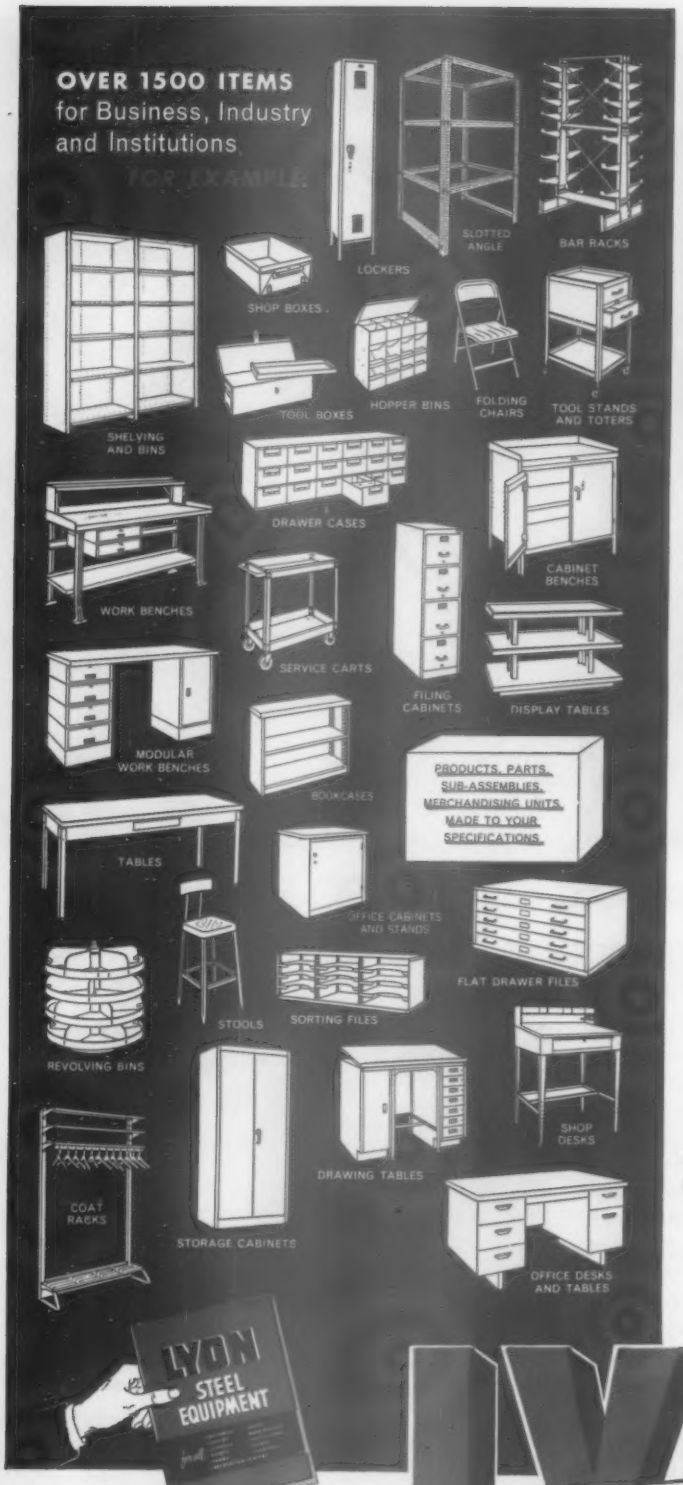
*Always insist on Ⓐ Trademarked Safety Products.*

Worker sawing aluminum base plate for nuclear fuel storage rack.

American Optical
COMPANY
SAFETY PRODUCTS DIVISION
Southbridge, Massachusetts

*Safety Service Centers in Principal Cities*

## Your Surest Protection . . . AO SURE-GUARD Products




# DESIGN makes the DIFFERENCE

***...and top design is one of many dividends when you buy***

# QUALITY PROTECTED LYON STEEL EQUIPMENT

•

***THE "QP" ON EVERY LYON CARTON IS YOUR ASSURANCE OF QUALITY EQUIPMENT***

See your Lyon Dealer for delivery from stock of the world's most diversified line of steel equipment.

•

**LYON METAL PRODUCTS, INC.**

General Offices: 912 Monroe Ave., Aurora, Illinois
Factories in Aurora, Ill.—York, Pa.—Los Angeles
Dealers and Branches in All Principal Cities

**THIS CATALOG ILLUSTRATES THE WORLD'S MOST DIVERSIFIED LINE OF STEEL EQUIPMENT *IT'S FREE!***

**LYON®**
**STEEL EQUIPMENT**

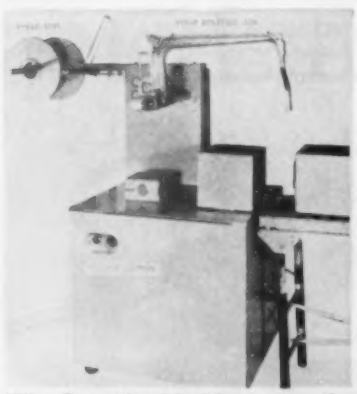


For more facts Circle 481 on Reader Service Card

For more about these items, circle item numbers on Reader Service Card next to back cover.

**176—Roll-Up Aluminum Ladder** can be carried like suitcase or placed in car trunk, then unrolled to 12 or 16 ft. and locked in 30 sec. Unrolled, it is rigid and easily supports 1000 lb. Rolls into 20-in. dia., 24-lb. bundle for easy storage. *Aladdin's Products, Inc.*

**177—Rotating Union** is ideal for single pass applications where shaft speed is under 250 rpm. Operates at 150-psi. air or 2000-psi. hydraulic pressure. Long "O" ring life due to minimum thrust and radial load. Low cost; in ¼-in. IPS hose connections. *Deublin Co.*



**178—Strapping Machine** automatically applies, tensions, and seals rayon strap on various-size packages. Straps 15 packages a minute with 3/16-in.-wide rayon. Adjusts to package sizes from 6x2x8 in. to 18×36 in. by any length. Knob controls tension. *A. J. Gerrard & Co.*

*Turn the page*

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# "Get rid of that DUST!"

"The boss was sore and I was on the spot.

"He shoved the report from the efficiency engineer at me. I read it: 'Yearly loss due to machine wear, misalignment and down time . . . $3,000. Major cause . . . abrasive dust.'

"The boss pointed his finger at me, 'Get rid of that dust and get rid of it fast!' "

## Now, it was my problem, and I was on the spot.

"First thing I did was to check into a central dust collecting system. But the lowest bid I could get was $8,000. Too much.

"Then I came across a Torit ad, offering economical portable dust collectors.

"Two days after my call Torit engineers showed me how in only one week they could install a portable, unitized Torit Dust Collector at each of our eight grinders, trapping dust right at its source—cleaning the air throughout the entire plant.

"Total cost? Only $2400.00. That's a $5,600.00 saving over the lowest priced central system.

"You guessed it—we installed the eight Torit Collectors."

## Torit solved my problem

"This year when we received our report it read: 'Loss due to machine wear, misalignment and down time...$340.00.' A saving of $2,660.

"This time the boss was all smiles. He slapped me on the back, 'Charlie, you did a fine job getting rid of that dust. Frankly, I didn't think it could be done with such a small investment.'

"Now there's a pretty nice fellow to work for.

"If you've got a dust problem, or are about to have one, write the Torit people. They've manufactured and sold more dust collectors than anyone else in the U.S.A. Chances are they can help you the way they helped us."

**TORIT manufacturing company**

**1133 Rankin Street, St. Paul 16, Minn., Dept. 311**

**For more facts Circle 483 on Reader Service Card**


## FACTORY / EQUIPMENT NEWS

*Begins on page 124*

**For more about these items, circle item numbers on Reader Service Card next to back cover.**

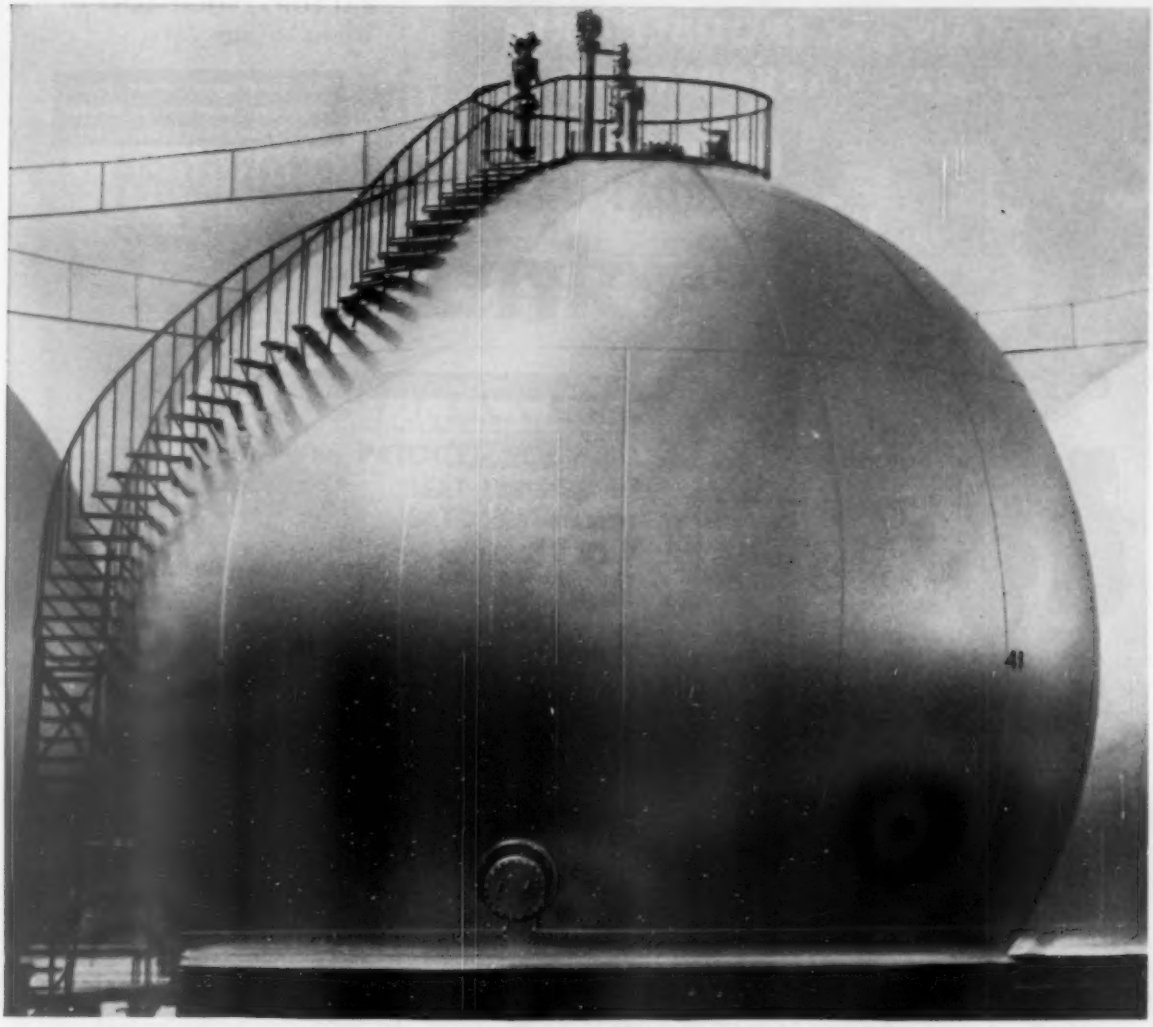
**179—Two-Way Radio,** table model, communicates with in-plant vehicles, cars, trucks, and portable or shirt-pocket radios on same frequency. Low-cost, saves floor space. In three models—to 60 watts for low band, 50 watts HF or 15 watts UHF. *General Electric Co.*

**180—Jig Borer,** 3 in., will also do production milling in single set-up. Features extra-fast positioning with repeat accuracies to ±0.0001 in. Spindle, 16 in., feeds at speeds of 0.012 to 120 in. per min. Cuts toolroom costs. *Giddings & Lewis Machine Tool Co.*

**181—Liquid Level Control,** for processing systems and water and sewage, can be installed in hard-to-reach reservoirs and underground tanks. Comes in simple-to-install package; operates at ½% accuracy in water from 10 in. to 10 ft. No cleaning or servicing. *Foxboro Co.*

**182—Miniature Circuit Breaker** automatically cuts off power to prevent small motors from overload or overwork. Attaches in minutes to plug of portable power tools and appliances. Button instead of fuses re-sets breaker. Available in 3 to 10 amp. *Modern Mfg. Co.*

*Turn the page*



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# REYNOLDS ALUMINUM

Watch Reynolds new TV show "Harrigan & Son", Fridays, starting October 7; also, "All Star Golf", Saturdays, resuming October 15—ABC-TV. And on Sunday, October 16, be sure to see the exclusive showing of America's new 1961 cars on The National Automobile Show, direct from Detroit over CBS-TV, 6 to 7 P.M. EDST.

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LP Gas Carburetion Equipment & Supply Co., P.O. Box 1322
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Mid-States Auto Electric Co.
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Gulling Auto Electric Company
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1101 Second Avenue, S.E.
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Box 15, 4415 East 14th St.
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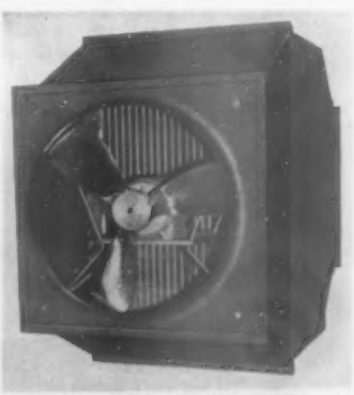
## FACTORY/EQUIPMENT NEWS

*Begins on page 124*

For more about these items, circle item numbers on Reader Service Card next to back cover.

**183—Limit Switch Assembly,** remotely controlled, permits mounting for easy wiring and maintenance, or freedom from moisture, dirt, vibration, heat. Air actuated by variations in air leakage rates. No air valves. Uses 40- to 80-lb. pressure. *R. B. Denison Mfg. Co.*

**184—NEMA 00 Starter,** for low hp. jobs, is rated from ¾ hp. 110 v. to 2 hp. 440/550 v., 3 phase. Compact, costs less than size 0 unit formerly specified for same applications. Open or NEMA Type-1 enclosure, optional pushbutton or selector switch. *Square D Co.*



**185—Steam-Fired Air Intake,** in single cabinet that houses propeller fan and steam coil, replaces air removed by exhaust. Comes in four standard sizes, 4000- to 36,000-cfm. ranges. Steam coil can be omitted if tempered air is not needed. *Hartzell Propeller Fan Co.*

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Fig. 1236 — 200# S.W.P. — R.S. Gate Valve
Also available Fig. 1232 N.R.S. Gate Valve

Now, without ever removing the valve body from the line, you replace the seat rings in a gate valve. In just 7 to 10 minutes you have the equal of a new gate valve back in service. No special tools or skills are needed. Just think of the savings in time and effort you get. This patented Renewable Seat Ring Bronze Gate Valve is just one of the typical values to be found in Fairbank's full line of bronze and iron body valves. Valves that are being specified and installed in an ever increasing number of the nation's newest, most modern buildings!

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Fig. 9215-S — General Purpose Truck

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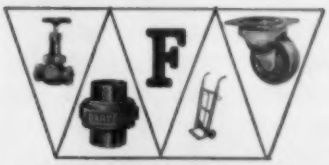
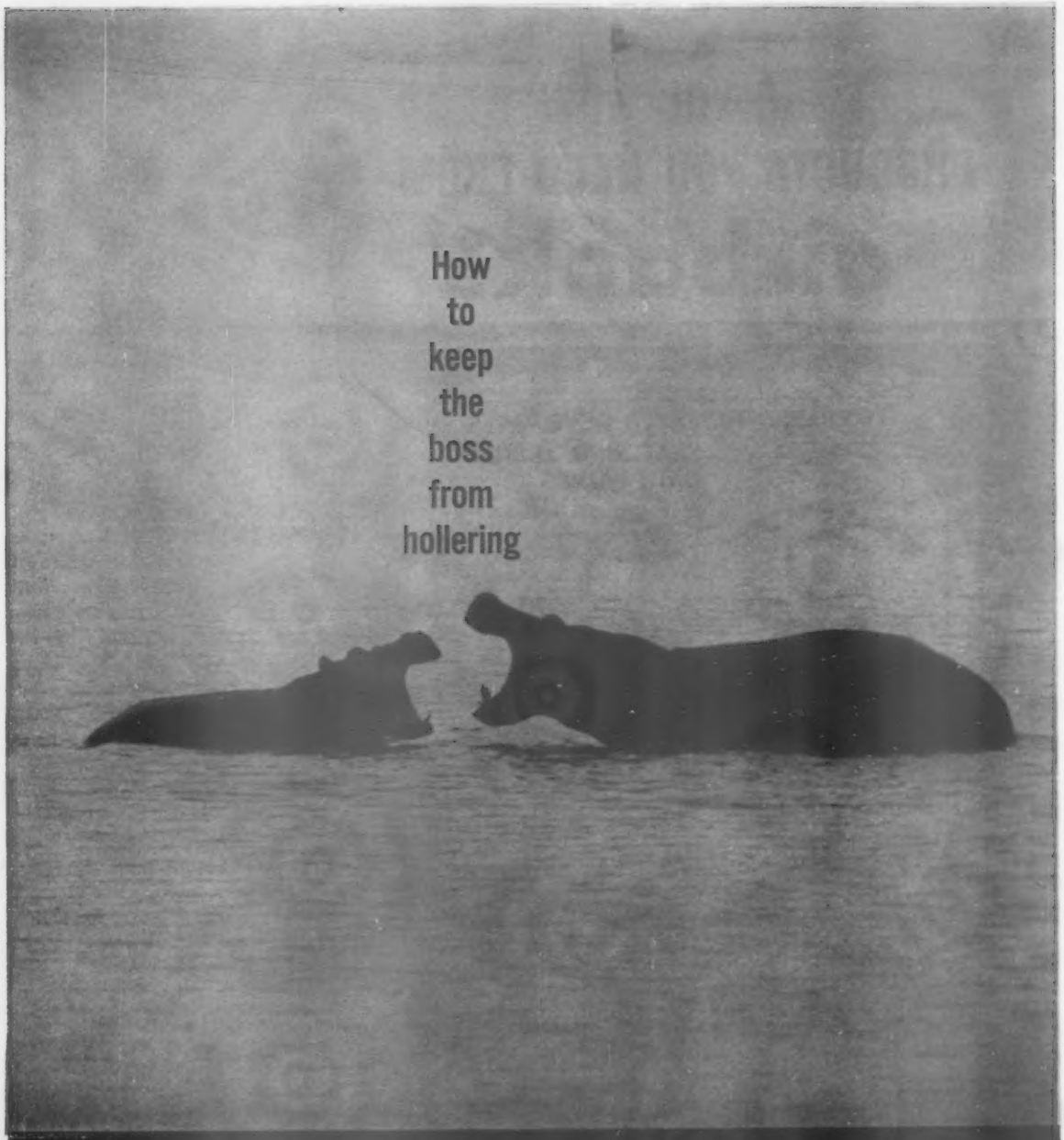



• VALVES • DART UNIONS • CASTERS • TRUCKS • WHEELS



For more facts Circle 486 on Reader Service Card




## ...about metal and masonry corrosion.

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If your industrial distributor is not currently stocking these products, write to Industrial Tar Products Dept.

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*FACTORY*

# PLANT OPERATIONS CASE BOOK

## TV BLUEPRINT

Engineers all over this G-E plant have access to needed tracings at a moment's notice—closed-circuit TV system puts them in instant contact with the blueprint room . . . page 181.

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CASE BOOK

NORMAN H. SOLON, EDITOR

No. 35 September 1960

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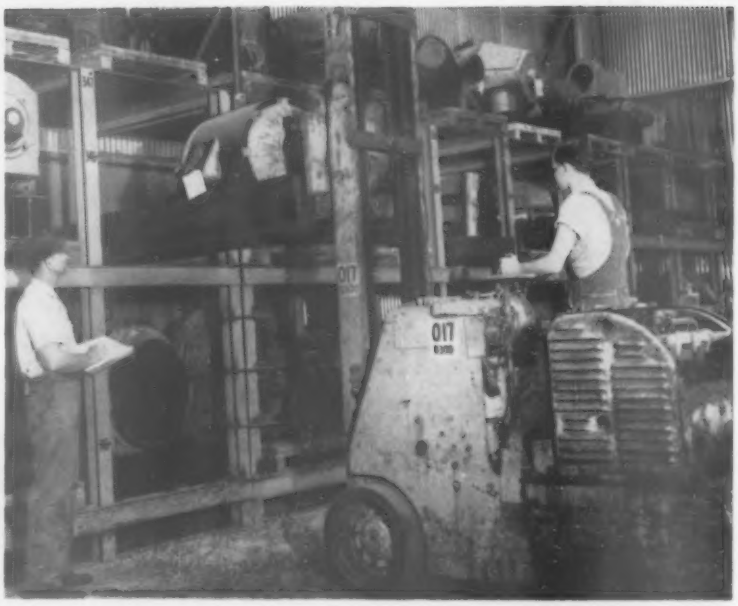


# Keeping a finger on motors

There's no wasted motion in locating and moving electric motor replacements for production equipment at Reynolds Metals Company's Sheffield, Ala., plant.

Key parts of the system are some 300 bins of motors and a master reference book that lists the 600 and more spare motors on hand. Each motor or group of smaller motors of the same type is stored on a pallet in a numbered bin. An aluminum tag is attached to each motor noting serial number and basic data.

The index book notes the bin in which each replacement motor can be found. It also tells horsepower, make, frame speed, bearing number, and other data for the motor. Listings are broken down into a-c, d-c, and horsepower classifications.

Here's how the system operates in the case of a breakdown during normal working hours:

The electrician on duty calls the foreman of the storage area, giving him specifications from the nameplate on the faulty motor. By checking the master reference book, the foreman can find an exact replacement in seconds in 95% of the breakdown cases. (The cost of having replacement motors for the other 5% would be prohibitive. However, motor parts are available.)

The aluminum tag is then removed from the replacement motor and placed in an out box. This serves as a constant reminder to the maintenance crew that a motor of that specification is in need of repair. The replacement is then carried by fork truck to where it's needed, sometimes faster than the faulty motor can be removed from the machine.

Each motor under repair is noted in a card file, giving the company a pretty good idea how often to expect a motor to break down over a period of time. This is a big help in inventory control.

After normal duty hours the master reference book is placed in a spot that's convenient to any electrician on duty.

This control system at Reynolds has replaced the all-too-common method of putting replacement motors on the floor in helter-skelter fashion, locating them when needed by the hunt-and-peck method, and then lifting them manually from floor to truck.

**OCTOBER CASE BOOK**

Keeping a sharp eye out for more efficient ways to get the job done is paying off three ways at Cook Electric: cuts production time, reduces costs, improves quality of product. This all adds up to profits.

## This container goes all the way

This container has a dual use at Boeing Airplane Company's Seattle plant. It's used both for packaging and in-plant material handling. And it eliminates seven separate handlings in the movement of auxiliary power units from a vendor through shipping, inspection, and testing to the point of actual use on the assembly line.

In the past, units were shipped from the vendor in bulky nailed containers mounted in an inverted position. When received, each unit had to be removed from its container, remounted on a special in-plant handling rack, and then placed in a new container. During functional testing, the units again had to be completely unpacked, mounted on testing stands, and later repacked for removal to the point of use.

Now a unit arrives in a container designed to eliminate all unpacking and remounting operations between vendor and point of use. Top and sides are removable for inspection. And the container base serves as a mount for testing.

Diagonal spindles lock the entire box into a rigid unit but are easily removed with pliers for inspection, testing, or disassembly.

## Union asks for plant registration

Permission for hourly workers to register for the national elections at their place of employment has been asked by United Auto Workers (Detroit). The request was made in a letter to Ford Motor Company's industrial relations vice-president in Detroit.

The union also asked that selected blue-collar employees be allowed to work for the party of their choice at the polls on election day, with lost time paid for by the company. Ford has already granted permission for certain salaried personnel to take time off for that purpose. For more facts on the role of business in politics, see page 91.

## Flick the dial for blueprint close-up

*(Cover story)*

Personnel throughout General Electric's Lynchburg, Va., plant have immediate access to the blueprint distribution center, without leaving their work benches. Through an inter-plant closed circuit television (G-E) and an intercom, employees can be in two places at once.

The camera is installed in the blueprint room and trained on a display board, with tracings filed close by. It's connected to several 12-in. TV monitors in the drafting-engineering, assembly planning, and assembly areas.

Each monitor is equipped with pan, tilt, and zoom lens control to operate the camera remotely. This means, for example, that an engineer can get a close-up view of any portion of the tracing he needs by merely adjusting the controls at his monitor. The two-way intercom system puts him in contact with the blueprint room, allowing him to consult with personnel on any questions regarding a sketch.

Since the system enables an engineer to see any sketch he needs instantly, it eliminates reproduction and delivery of blueprints.

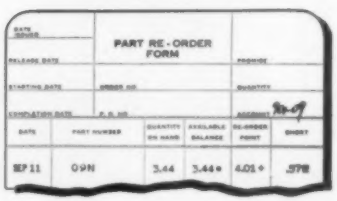
Installation would cost $5000 to $10,000 for most plants.

## Beating the bell

The eternal jangling of telephones doesn't play havoc with nerves of engineers working in large offices at Norton Company's Worcester, Mass., plant. And no one picks up a phone unless the call is for him.

All office calls are routed through the receptionist, who locates the man wanted through selective paging. The office is divided into eight phone zones, each with a receiving box. The receptionist calls the name over one of the boxes. Since her voice can be heard only in the immediate area, it doesn't disturb the rest of the office. If the man wanted is not at his desk, the others in the area ignore the call. There's no fumbling for pencils or interruption of work while someone has to take a message.

If no one answers, the receptionist takes the message.


PART RE-ORDER FORM

| DATE | PART NUMBER | QUANTITY ON HAND | AVAILABLE BALANCE | RE-ORDER POINT | ORDER |
|---|---|---|---|---|---|
| SEP 11 | 09N | 3.44 | 3.44 | 4.01 | .578 |

## Computer makes like purchasing agent

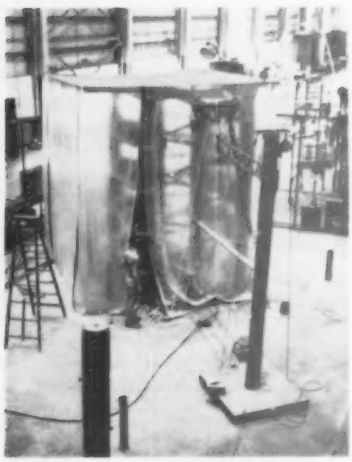
A machine institutes re-orders at Linde Company (Essington, Pa.), division of Union Carbide Corporation. The F-300 (Burroughs Corporation, Detroit) is the heart of an integrated inventory control system for the 12,000 types of parts stocked at the plant.

The machine is able to compare automatically the pre-set re-order amount with the available quantity of any given part. Should current stocks of any item fall below the re-order point, the machine is programed to prepare part of a re-order form (shown above). And it notes the amount of the shortage for each item on the form.

1. Electric eye stops traffic.

# The war on WASTE is not costly...

**. . . at General Electric Company's medium transformer plant in Rome, Ga. The price: a large measure of ingenuity and a small expenditure for devices that improve efficiency. Any gremlins that disrupt production or damage the plant's expensive product mean greenbacks down the drain. Could be the difference between red and black ink. Here are four ways in which G-E is insuring that this won't happen:**



2. Shower curtain fights dust.

**1. Electric eye plays traffic cop.** Heavy transformer tanks coming off a conveyor can play havoc with floors if the conveyor isn't halted when a tank reaches the end of the belt. This can't happen with the photoelectric cell device (arrow) shown above.

This electric eye stops the conveyor when a transformer housing passes across the beam. The conveyor can't move again until its "go" switch has been re-set. With the cell (cost: $140) there's no need for a man to watch the conveyor.

**2. Keeping dust out.** This overgrown shower curtain is protecting a $250,000 piece of test equipment from dust. Made of polyethylene 1/100 of an inch thick, the cover is supported by a wooden frame. Slit openings for servicing and adjusting the machine are reinforced with masking tape. Cost for the cover and frame: $100.

**3. Straightening spools.** Large spools are straightened in seconds with a plant-made machine. Before this device was built, workers carried warped spools to the other end of the plant. Here, straightening the spools consumed costly production minutes on a $75,000 machine.

The new straightener is a hydraulic cylinder operating against an anvil. It's installed in a spot convenient to the spool storage area. It was originally designed to operate with the cylinder moving vertically. But employees found the spools could be handled more easily with the machine turned on its side.

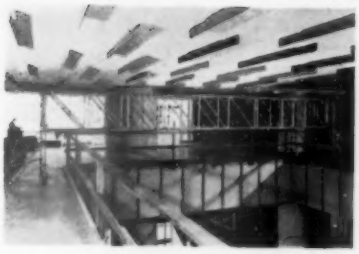
The company designed and built the machine at a cost of $2100.

**4. Carrying mandrels by truck.** A modified fork truck on tracks makes short work of handling heavy mandrels. Truck is equipped with metal wheels to fit permanent trackage, plus special hydraulic mandrel handling arms.

The arms lift the mandrel, move it from a horizontal to a vertical position, then insert it into a clamp mounted on an overhead conveyor for vertical storage. Upward pressure on the clamp automatically locks the mandrel tong. Downward pressure releases it.

3. Gizmo straightens spools.

4. Arms hug mandrels tight.



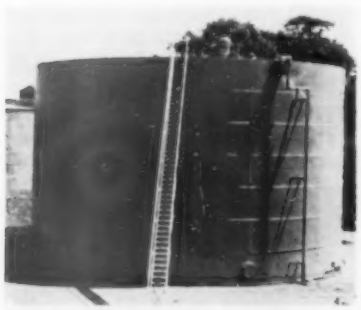
## Bridge on wheels builds in 10 minutes

This folding truss aluminum bridge scaffold was the work bench for installing a luminous ceiling over an escalator well at Kaiser Aluminum and Chemical Corporation's Oakland, Calif., plant.

Built in 10 minutes, the bridge on wheels is an assembly of two vertical trusses enclosing a work platform that can haul two men. Each truss has three 12-ft. folding sections that serve as guard rails.

When not in use, the scaffold (Up-Right Scaffolds, Berkeley, Calif.) folds into a compact assembly and can be easily hauled by hand truck to storage.

Use of the quickly assembled bridge scaffold for such jobs saves valuable time that would otherwise be spent in building a floor-supported rig or ladders.



## Sealing with epoxy

This million-gal. tank kas made leakproof by calking critical areas with a metallic epoxy resin compound at Fall River Gas Company, Fall River, Mass. A welding operation would have been a much more costly proposition.

The application procedure consisted of sandblasting the critical surface and then applying the epoxy resin compound (Smooth-On Manufacturing Company, Jersey City, N.J.) with a spatula.

Some 2000 linear feet of surface was calked with 40 gallons of the epoxy compound.

## Pumping hot stuff as high as the roof

Asphalt heated to temperatures ranging from 450 to 500 F. was pumped to the roof at 30 gallons a minute during a recent roofing job at Central Scientific Company, Somerville, Mass.

Result: The job was completed 20% faster than if open-flame preheating had been used. The pump and parapet unit (photo) also minimizes the possibility of hot material injuring the workers.

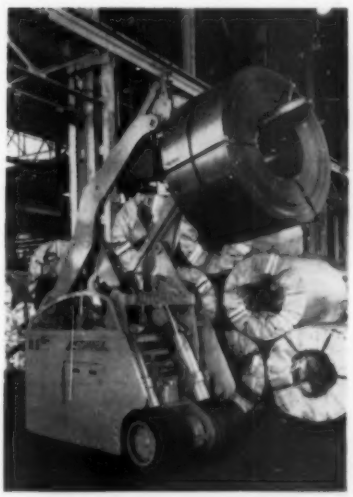
The roof pump (Hauck Manufacturing Company, Brooklyn, N.Y.) is fed from a 360-gal. tube-fired kettle at street level. A simple lanyard controls the pumping.

## Nine companies sub for college campus

The first trainee to go through an unusual four-year study and work course, designed to prepare him for an engineering career, has recently received a certificate for completing the course from Eureka Specialty Printing Company, Scranton, Pa.

The course, set up with the cooperation of eight engineering companies in New York and Pennsylvania, was established to tap talented high-school graduates who are financially unable to attend college. During the entire four-year apprentice program, the trainee was on Eureka's payroll, although actually employed in its plant for only two brief periods. The rest of the time he worked and studied with seven other companies and attended night courses at New York University and Broome Technical Community College, Binghamton, N.Y.

The results of the program are being studied for possible revisions in the training cycle. Kurt R. Schneider, Bainbridge, N.Y., one of the participating companies, is considering the feasibility of a mass training program of this type.



## Handling heavy coils the carefree way

Moving mammoth steel coils weighing 15,000 pounds apiece is no problem at Oldsmobile Division (Lansing, Mich.) of General Motors Corporation. This Elbo electric lift truck (Automatic Transportation Corporation, Chicago) can lift up to three coils at once.

Previously, the company used a shop tractor with a rack trailer, plus a 5-ton finger truck. Since it required an overhead crane hoist to load and unload coils, this method ate up too much time. The finger truck did not have the lifting capacity for the job.

Now the Elbo lift truck lifts the coils from the receiving area and transfers them to the storage area fast and efficiently.

## Twin mercury fixtures bring light skyward

Lighting at American Airline Company's new Idlewild (New York) hangar is as complex as in any high-bay industrial plant. Recently, the airline was faced with the problem of providing 60-65 foot-candles of maintained light at 30 inches above the floor.

The job was complicated by an extra large number of roof trusses. Management pondered the pros and cons of installing high output fluorescent lamps versus mercury vapor lighting. The latter required only 333 kw. compared to 412 kw. for fluorescent units. It was finally decided to use twin 400-watt mercury fixtures (Holoplane Company, Inc., New York) with pneumatic reflectors. These were chosen in preference to individual 1000-watt units, even though the latter installation would have cost less.

The twin fixtures now straddle each reinforcing strut in the hangar's roof structure, thus eliminating the shadow problem that usually results from a smaller number of large reflectors. About one in 15 of the twin fixtures has one 1000-watt incandescent bulb in place of the mercury vapor light. The incandescent units are in use all the time, while the mercury units are switched off when there is no work being done in the area.

Lamp replacement is done on a monthly basis. To date it has taken about 15 mercury lamps per month for the 1440 outlets.

## 62,000 dots a second

A data transmission system that's capable of sending 62,000 characters per second over a microwave relay system has been developed by Motorola, Inc., Chicago. It can transfer data from one computer center to another or from gathering points to a computer.

The system uses a single wide band subcarrier channel to achieve the ultra-high-speed transfer.

## Glass and aluminum fight rust

This combination of glass block windows and aluminum ventilators has eliminated a major corrosion problem at Ralston-Purina Company's Battle Creek, Mich., plant.

Old steel sash that had been in use for 20 years was so badly out of shape that many windows would not close properly. Heat from cooking operations caused moisture to condense on windows. This meant a continuous battle against corrosion.

The steel sash has now been replaced by glass blocks and aluminum sash, thus ending corrosion worries. The glass blocks have a smooth inner face that makes window cleaning a breeze. Calking and painting are unnecessary because the blocks are mortared into place.

Other advantages of the new glass block are a high insulation factor, equal to a 12-in. concrete wall, and a blue-green diffusing screen to cut down heat and glare.

More than 32,000 square feet of block (Pittsburgh Corning Corporation, Pittsburgh) has been installed in four plant buildings.

**WATER AND OIL—BUT NO FALLS**

Though this floor looks like an accident waiting to happen, there have been no reports of falls in almost a year at St. Regis Paper Company's Bucksport, Me., plant. Reason: A bonding resin treatment (Mine Safety Appliances Company, Pittsburgh) has created a safety path through the slippery areas of the plant. Because water and oil puddle the plant's concrete floors in many places, the company covered 1400 square feet of walkways with 14 gallons of resin bond. The first coat of bonding resin was applied and sprinkled with grit particles. This dried in 90 minutes and another coat was then applied. These applications have proved durable despite heavy traffic and frequent hosings with steam-detergent mixtures.

# Making moving day less of a mess

**Moving into a new plant is at best an unproductive and annoying period for any company. Robert O. Smith, chief of manufacturing, Pickard & Burns, Inc., suggests following this checklist to make moving as painless as possible:**

PLANNING STAGE

- Appoint a Move Manager for organization.
- Set moving date. Consider moving overnight or over a weekend.
- Plan detailed layout for furniture and equipment, complete with tag numbers for each unit.
- Determine where plant personnel can assist; circulate copies of the layout plan and time schedule to all employees. Each worker should be familiar with the general plan and his role in it.
- Check the effects of moving on insurance coverage.
- Get in touch with the local telephone company executive. Get his commitment that service and directory listings will be available by move day and that operators will be briefed on new numbers.
- Have newly purchased equipment delivered to the new plant.
- Decide what old equipment to scrap; get rid of it before moving.
- Get the OK of lessors to move leased equipment.
- Get competitive bids for moving and rigging services. Save grief by checking references and bonding. Provide bidders with heights and widths of doors and other critical dimensions. Save time by briefing all bidders at once.
- Secure at an early date approvals for the new plant from building, fire, and insurance officials.
- Test well in advance the operation of all systems, hardware, overhead cranes, and other new plant building and ground equipment.
- Demand good drawings of each system in the new plant.
- Get final clearance details approved by lessor of old plant.

MOVING OPERATIONS

- Have supervisors draw two days' supply of parts and materials to tide them over the moving period.
- Move departments in logical sequence to minimize downtime. For example: stockrooms, receiving, incoming inspection, engineering, purchasing, tooling, machine shop, electrical shop, sheetmetal, painting, subassembly, final assembly, testing, shipping, and offices.
- Have workers take their own tools home the night before moving.
- Have each department head follow his equipment during the move, so he will be in position to supervise setting it up.
- Appoint someone to use a car for shuttling emergency shipments between plants.

*Source: Robert O. Smith, Chief of Manufacturing Section, Electronic Products Department, Pickard & Burns, Inc., Needham, Mass.*

1. HE'S TOTALLY DEAF.

2. HE'S PARTLY BLIND.

# Handicapped but productive

Employing the handicapped is not an act of charity at Speakman Company, Wilmington, Del. These workers are paying their own way. In some cases the handicap is a definite advantage productionwise.

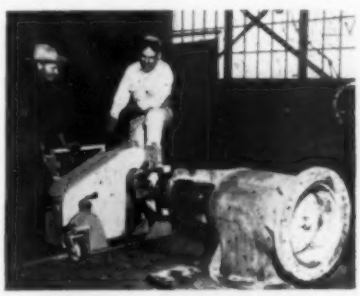
Take the case of deaf Foster Massie (left photo). He's not distracted or fatigued by the high noise level around the drilling machine.

Deaf mutes are good reliable workers at Speakman, according to James R. Masterson, Jr., works manager. They're especially efficient at noisy buffing and polishing or drilling machines where normal workers have problems.

These men are hired and trained at the plant and usually reach full productive capacity in six months. There's little trouble in communicating with them—lip reading gets adequate instruction across. And one problem never comes up—too much gabbing on the job.

Fred Lord (right photo above), with the company for 49 years, is 70% blind. Yet he can still efficiently repair plating racks. Another man with only 10% vision safely operates a lathe.

The company makes one concession to these handicaps. It puts such workers on base rates, not incentives. This eliminates any temptation to speed up beyond a safe rate.



**DRIVE OUSTS STEMS**

A mechanical drive used to extract stems from angle valves 10x12 feet and larger has increased efficiency at Kaiser Aluminum & Chemical Corporation, Baton Rouge, La. One man can now remove a stem in less than 15 minutes. Formerly, the valve stems were removed by hand.

## Flexible handling

This inverted lift handles a 2500-lb. generator like a toy at Pratt & Whitney Aircraft Company, East Hartford, Conn. It can move the generator up and down, rotate it in almost a complete circle, tilt it, move it laterally along an overhead rail. The generator is attached at the bottom of the lift.

This flexibility allows any part of the generator's surface to be positioned at any angle.

The lift uses five motors and the entire operation is controlled by pushbutton. Full lateral movement is 30 feet. It was designed by Colson Corporation, Chicago.

## Slides are worth a thousand words

The impact of a disabling accident is being brought home to management through the use of slides at Gulf Oil Corporation's Port Arthur, Tex., plant.

With the slides, supervisors and managers attending the monthly council meetings on accident prevention can now get a clearer idea of exactly how the accident occurred. And they get it much faster than they would through word description, thus saving valuable time.

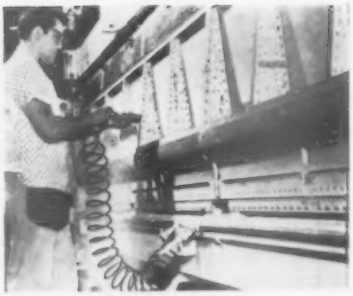
When a slide taken at the scene of the accident misses some details or doesn't tell a complete story, a drawing or diagram is made into a slide. Sometimes a close-up lens photographs a bent hook or damaged piece of machinery that could be the key to the accident.

Both black-and-white and color slides are used.

## Workers nix laundered gloves

Thinking about laundered gloves for workers in paint spray booths? If so, you may run into labor trouble. Rather than don the laundered gloves, 20 paint sprayers—members of the United Auto Workers—walked off their jobs recently at Ford Motor Company's Mercury Division, Detroit.

According to a union spokesman, the gloves were completely inadequate because they were encrusted with paint. And in most cases they had shrunk. "Some of them were so stiff the men couldn't even pull the trigger on the paint gun," complained the spokesman.



## Snake-like hose

There's no storage problem with this nylon air hose at Northrup Aircraft, Inc., Beverly Hills, Calif. It coils up like a telephone cord when not in use.

The hose (Nycoil Company, Westfield, N.J.) can be connected to any air line with quick-disconnect fittings. Available in 25-ft. lengths, the hose coils to only a few inches in its retracted position. This means it's always out of the way and doesn't require any costly recoil mechanism.

*Reprints of the Plant Operating Case Book are available. Price 50¢. For quantity prices, write Reader Service Department, FACTORY, 330 W. 42nd St., New York 36.*

**IT'S JUST A FRINGE BENEFIT—FOR BEATNIKS**

How'd you like this with your morning cup of coffee? It's a mosaic depicting the history of the oil industry and, for better or worse, encompasses one complete wall of the employee cafeteria at Esso Nederland's plant in Rotterdam, Holland. How digestible this would be to the average American worker eating his ham on rye with a coke may be open to conjecture. But the beatniks would dig it!

TESTING MANAGEMENT CANDIDATES . . . TRAINING THEM UNDER DEPARTMENT SUPERVISORS.

# Five-year program to revitalize management

Half a decade ago, management at Athenia Steel Division of National Standard Company took a long look at itself in the mirror. And it didn't like what it saw.

Management had come to mean little more than names on office doors, little supervision in the shop. As a result, business was sliding—despite the generally booming condition of the nation's economy.

**Solution was a two-part program: (1) Revamping of the management team from assistant foreman up. (2) Modernization of plant and equipment.** (Second phase will be discussed in October's Case Book.)

As Athenia's Manager John A. Johnson saw it, the root of the problem lay with the incentive plan. He claimed that it took managing away from management.

"Our workers didn't need management under that system. Their prime concern was to turn out enough output to meet a quota. There was too much emphasis on the pocketbook—too little on quality. We finally reached an agreement with the union that eliminated the system by giving workers a raise in their base pay equal to their average wage under incentive. Finally, we have management back in our own hands."

But to install management wasn't easy. Rough-tough steel men, unused to much discipline, weren't going to knuckle under without a fight.

The average age of management personnel at that time was over 55—with the majority approaching retirement. For some of these men jobs were reshuffled. For others, the retirement age was moved up a few years. There was no wholesale hatchet work, but the management force was completely revamped.

The immediate aim was to get a middle-management team (foreman and assistant foreman) who could install discipline—lay down the line when needed. Under a union agreement, the company first gave its own employees a crack at these positions. However, the men in the shop showed amazingly little inclination to accept additional responsibility.

During the first two years management men were hired primarily for their aggressiveness. Discipline finally took hold. Then, in 1957, the employment policy shifted. The company was now ready for the *complete* man.

**Athenia now likes to hire young businessmen—not necessarily technical grads.** A composite picture of its newly hired management employee is a man 24 to 35 years old with a B.B.A. or B.S. in business—although a degree is not a definite requisite. He is a good mixer and can handle himself equally well socially or in the shop.

Extreme selectiveness in hiring helps to insure this. A series of written tests on such traits as intelligence, judgment, math, space perception, social insight, general interests, and motivations are taken by each candidate.

**A one-year training course has been set up to familiarize all new members of management with the operations of a steel mill.** Whether a man will eventually be a personnel manager or assistant foreman in the maintenance yard, he undergoes the same training. This includes serving as an assistant to the supervisors of 22 separate departments in the plant—ranging from the die room to the general office.

This allows a man to be shifted or promoted with a minimum of breaking-in time. It also indicates where his talents can best be used. A card file is kept on each employee on the supervisory level. It records his strengths and weaknesses as observed by members of top management. The card also lists candidates for each job in case a man is promoted or leaves the firm.

Management teamwork goes beyond the working hours. A management club has been instituted where families meet periodically to promote social friendships. This, in turn, leads to more harmonious teamwork.

There are now 33 supervisors—most of them hired during the past five years—handling 225 hourly workers. Five years ago there were only 28 supervisors.

What has been the result of this five-year plan? According to Johnson, a young, aggressive, efficient management team has filled what was once a large void. The average age has been cut from above 55 to below 40.

"Most important," Johnson stated, "managing is once more a function of management."

## YOU BE THE ARBITRATOR

THE CASE OF

# The little man who wasn't there

Out of the experience of the American Arbitration Association

On Wednesday, Tom L., a methods engineer in an engine-building plant, notified the general foreman that he was coming in the following Saturday to experiment with a different layout of the assembly line. He told the foreman it would be necessary to move certain shelves and racks to another location. Since the union contract barred employees outside the bargaining unit from doing that kind of work, Tom expected a maintenance man would be assigned to it.

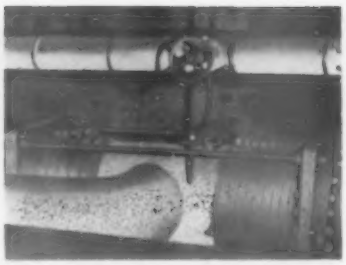
But Wednesday, Thursday, and Friday went by and nothing was done. When no one showed up on Saturday, Tom rearranged the shelves and racks himself.

When the union found out about it on Monday morning, it promptly filed a grievance. "The collective bargaining agreement does not permit engineers to do bargaining unit work," the steward reminded management. "You should have asked a maintenance man to come in on Saturday. This means you owe four hours' pay at time and a half to the senior maintenance man, because that's the least he would have earned had he been asked to work on Saturday."

The plant manager admitted that a slip-up had occurred, but denied the grievance on two grounds: (1) The situation on Saturday was an emergency, since Tom couldn't work without the rearrangement of shelves; and (2) the work he did was trifling.

Eventually the case went to arbitration. Suppose you were the arbitrator. How would you rule?

*For the actual decision turn to page 190*



## Expansion joint beats 25-ton force

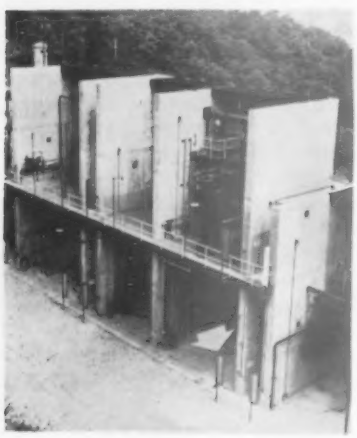
Excessive leaks on the main steam line were eating up maintenance dollars and causing downtime at Jones & Laughlin Steel Corporation's Aliquippa, Pa., plant. Repairs were required four or five times a year on the 18-in., 150-lb. saturated steam line.

A conventional packless expansion joint couldn't solve the problem, because it would put a force of 50,000 pounds on the steam pipe's end anchor. This weight could not be tolerated without extensive structural modifications.

The existing structure and piping arrangement ruled out the idea of tying the two ends of the line together with tie rods to combat the pressure thrust. And since the line was essentially a straight run, other types of expansion joints that restrain pressure thrust, such as hinged or swing joints, couldn't be used here.

The solution was an in-line pressure balance packless expansion joint (Yuba Consolidated Industries, Inc., Palo Alto, Calif.) that uses only two bellows. The joint can accommodate 3.625 axial compression and 0.375 lateral deflection. The lateral deflection is cold-sprung into the joint so that in the hot position the joint is under no stress for lateral motion.

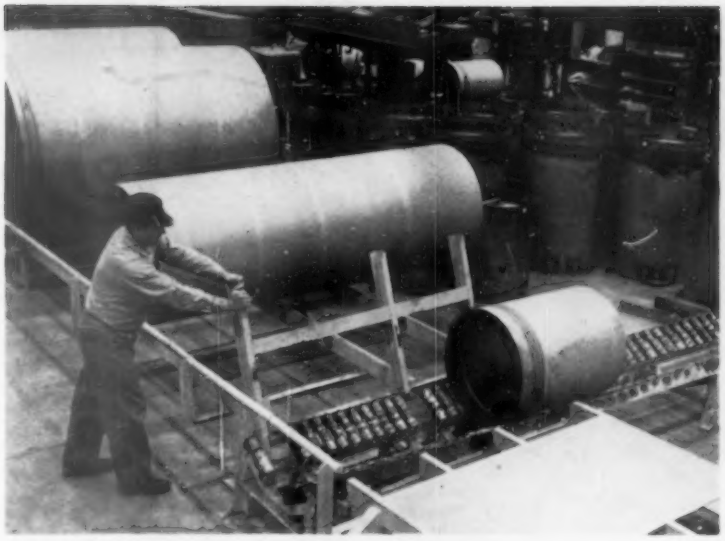
## Plant constructed with built-in safety



Safety dictated the building of Union Carbide Corporation's chemical plant in Institute, W. Va. Primary purpose was to minimize any danger to employees from a possible explosion. Here's the set-up:

The open-cell side (photo) faces the hillside, so the force from any explosion would hit an uninhabited area. Workers, however, never have to face these cells. They walk down corridors protected by heavy concrete sheet and inspect the cells when necessary through specially constructed mirrors (arrow). This means no worker is ever in the path of a potential blast.

**Contributions from readers reporting experiences will be welcomed. No need for fancy writing; just a clear, concise statement of facts. If you have photos or drawings, be sure to include. We'll edit for the Case Book. Contributions accepted will be paid for at time of publication. Address: Case Book Editor, FACTORY, 330 West 42nd St., New York 36.**



**HOLDING THE REINS ON AUTOMATION**

Even in a giant plant man can perform many jobs more economically than machines. A case in point is this transfer operation at Westinghouse Electric Corporation's Trafford, Pa., plant. Transformer tanks rolling down the tracks from the right are separated into large ones that keep on rolling to the left and small ones that go off to the right. Since sizes change only about every two hours, it would be too costly to install an automatic switching device. The operator who watches the automatic seam welder can easily trip the transfer switch when needed. And an automatic transfer device can be installed if production ever warrants it.

## Blast cleaning gets the job done

Getting paint to adhere firmly to metal furniture was a major problem at Lee L. Woodard Sons, Owosso, Mich. Mill scale, welding flux and spatter, and forging scale from the metal component stood in the way of a good bonding surface.

The plant first tried wire brushing and pickling. It proved time-consuming and costly, failed to clean surfaces satisfactorily.

Airless blast cleaning finally did the trick. A swinging work table, 96 inches in diameter, revolves the furniture around the blast machine (Wheelabrator Corporation, Mishawaka, Ind.). In two minutes, loads consisting of dozens of pieces are uniformly cleaned.

A phosphate coating follows the blast cleaning. This provides an excellent bond for paint.

## TV is peeping Tom

Industrial television treads where humans do not—or cannot—at Hawaiian Cement Company, Honolulu. One closed TV circuit in the plant constantly scans the inside of silos where the finished cement is stored. Thus, an operator at a central electronic panel can instantly tell when a silo is filled.

A second circuit is permanently installed inside a very hot kiln where no human eye can penetrate. This tells the operator how the burning process is proceeding.

# CASE BOOK CAPSULES

**A beam of light** brighter than the sun's center has been amplified by means of a solid-state electronic device at Hughes Aircraft Co., Culver City, Calif. Once the device is perfected, it will be able to illuminuate an area of the moon 10 miles wide.

**First all-aluminum** foil-wound power transformer (General Electric Co., Pittsfield, Mass.) has been installed at Aluminum Corp. of America, Massena, N.Y.

**Multi-color printed metal parts** can be fabricated directly from coiled strips while maintaining accurate registration, under a new system (Sylvania Electric Products, Batavia, N.Y.). It used to be done from metal sheets.

**Part of the Texas desert** may soon be eliminated through a new water conversion system, according to H. R. Drew, director of research for Texas Electric Service Co., Fort Worth. The proposed method may produce drinkable water from saline sources at a low cost of 30 cents per 1000 gallons.

**Synthetic fiber work clothes** for men, which are rugged yet lightweight and ultra-fast drying, have been designed for use by the Navy in hot, humid areas.

**An electronic brain** that can analyze the efficiency of a vehicle in a fraction of the time normally required by field tests is now being used at General Motors Corporation, Pontiac, Mich.

**The human element** may really take a beating in tomorrow's U.S. post office. Aerolab Development Co., Pasadena, Calif., foresees the installation of mechanical devices that can read handwriting. They'll be able to send letters automatically to the sorting machine.

**Changing and controlling** the composition of steel on a large scale is economically feasible under a new process developed by Lee Wilson Co., Cleveland.

**CRANE GIVES PLATFORM BIG PUSH SKYWARD**

Anywhere up to 48 feet skyward is working room for employees at Peter Kiewit Sons, Omaha, Neb. The key: a plant-made platform attached to a hydraulic crane (Austin-Western Works, Aurora, Ill.). The work platform remains level at no matter what angle the supporting boom is tilted. The boom can lift from horizontal to 60 degrees and rotate through full 360-deg. circles. It can telescope in and out from 25 to 48 feet when necessary. When the crane is needed for normal lifting, the platform can easily be disengaged and the hook rerigged.

## YOU BE THE ARBITRATOR

*Continued from page 188*

**The award**—The arbitrator said the situation on Saturday couldn't be considered an emergency, since management had more than enough time to cope with it on a non-emergency basis. Although the engineer had worked less than an hour, the arbitrator felt the issue was a serious one for the union and rejected the argument that the violation was "trifling."

While the union won the case, the arbitrator didn't grant exactly what it asked. He said the company could have assigned a maintenance man to the work without requiring him to come in on Saturday. One hour of overtime during the week would have done the trick. He therefore awarded one hour's pay at time and a half to the senior maintenance man.

*Caution: The award in this case is not an indication of how other arbitrators might rule in other apparently similar cases. Arbitrators do not follow precedents. Each case is decided on the basis of the particular history, contract, testimony, and other facts involved.*

## Bolted furnace slashes downtime

Bolting an outside shell to a 5000-lb. salt case-hardening furnace is paying off three ways at Stromberg-Carlson Company (Rochester, N.Y.), a division of General Dynamics Corporation:

1. Downtime was cut to one or two days a year from one or one and a half weeks a year.
2. Repair costs were reduced from $1475 to $970.
3. Safety was improved.

The furnace—a steel shell, brick lining, and a pot—has to be repaired annually because of a cyanide reaction. Formerly, men worked with air hammers to chip away the molten bricks from inside the shell. Then the brick lining had to be restored. This took time and was a potentially hazardous job.

The plant-built outside shell now used can be easily unbolted on four sides and the bricks and pot removed quickly. It cost Stromberg less to build it than to buy the commercial type used before.

## Plastic conveyor combats corrosion

A plastic roller conveyor system—said to be the first in the world—has eliminated sulfuric acid corrosion problems at Scranton Battery Company, Scranton, Pa. And it has ended the need for push-tables as part of the plant's handling system.

Metal rollers were impractical at the plant because of the severe acid corrosion. A 50-ft. test section of metal rollers was badly eaten away in six months. So push-tables had to be used. However, handling was slow and equipment losses from corrosion were heavy. A brand-new concrete floor over which the push-tables used to roll was completely shot in eight years.

The polyvinyl chloride system (A. M. Byers Company, Pittsburgh) uses plastic pipe for both roll and shafting. Rollers are 1½-in. pipe, from 8 to 16 inches long. Special plastic bushings cemented inside the roller ends hold the roller axles, which are constructed from ¼-in. plastic pipe. Axle lengths range from 10 to 18 inches in different parts of the conveyor.

Plastic sheets are also used as guide separators between lines of batteries in certain sections of the conveyor system.

After more than a year of service, the plastic conveyor system is reported in excellent condition.

Photo courtesy of St. Petersburg Times

# *Handled with Clark ingenuity...and care!*

Maybe you handle cartoned goods, or steel coils, or food in glass bottles, instead of rolls of paper. But the same important factor of *correct application engineering* is vital regardless of *what* you handle.

Take these paper rolls as an example. Industry needed a faster, safer, *damage-free* handling method. After a thorough study of all available techniques and equipment, Clark engineers developed the *ideal* paper roll clamp . . . one that provided every possible needed feature.

But Clark application engineering goes *beyond* special product design. It goes as far as specifically fitting the correct materials handling vehicle to your specific type of operation. It assures you of the right type of truck, in the correct capacity and power type, equipped with the right accessories and attachments. The end result is the ultimate in operating efficiency, at lowest possible cost.

We think we can help *you* through our application engineering. A call to your local Clark dealer (listed in the Yellow Pages) or a letter to the factory is all that's necessary to initiate action. If you care to write, address: Application Engineering, Clark Equipment Co., Battle Creek, Michigan.

CLARK® EQUIPMENT

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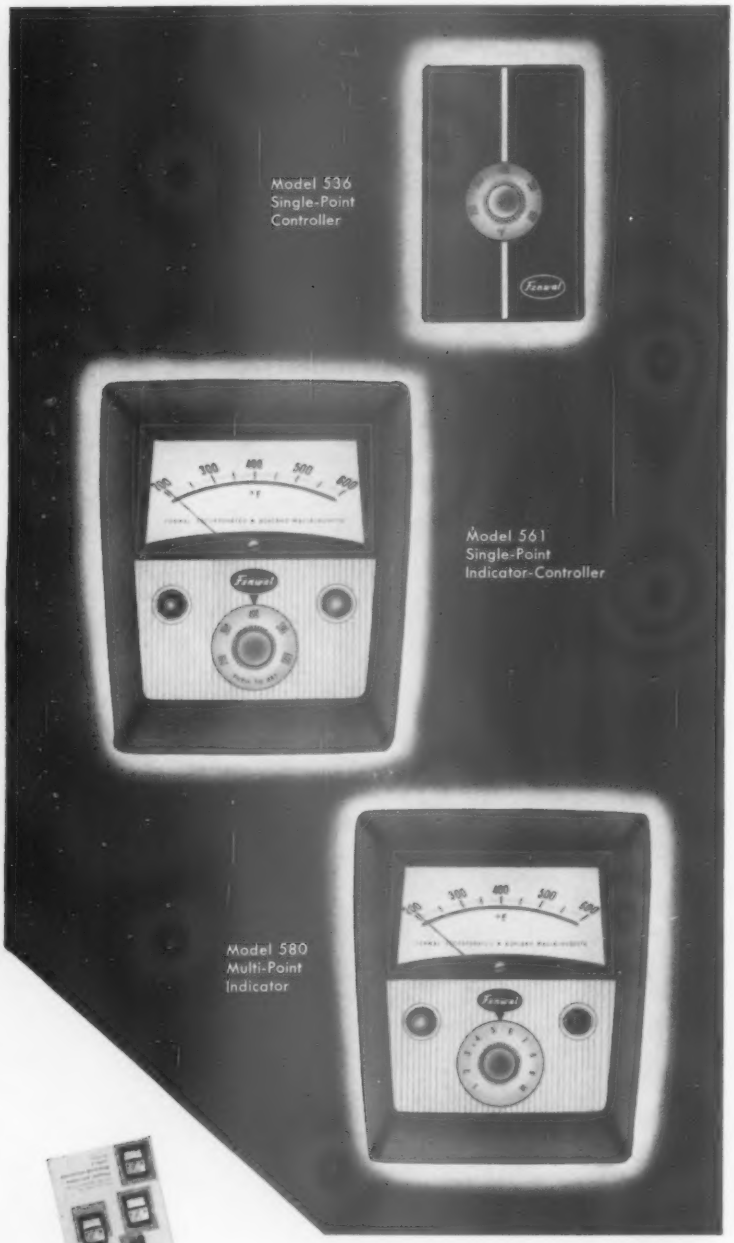
# *NOW*... A Better Match for Temperature Control Requirements . . .



Here's the brand-new family of Fenwal Transistorized Temperature Controllers that lets you order *only* what you need. In addition, you obtain functions previously unavailable in thermistor controllers. These additions to the "500 Line" permit *precise* matching of control instrument to application over a temperature range from −50 to +600°F.

Thermistor sensors and rugged, reliable transistorized circuits assure long life and trouble-free operation . . . and eliminate lead wire problems. Every instrument is easily installed . . . in the plant or on the machine. Professionally styled cases and wide choice of colors blend with the most modern surroundings. And, best of all, advanced Fenwal design and production methods keep costs reasonable! Here are three examples:

The Model 536: reliable, single-point controller gives you these options: ON-OFF or proportioning control . . . set-point adjustment in the instrument or remotely located . . . indication as well as control . . . expanded scales for fine temperature adjustment. And you pay only for the option you need. Capacity of 10 amp/110 VAC and 5 amp at 230 VAC.

The Model 561: single point indicator-controller designed for panel mounting. Panel button permits meter display of temperature set point. Control and indication circuits are independent. Mirror-backed scale prevents parallax, tilted glass cover reduces reflection. Option of either ON-OFF or proportioning control. 10 amp/110 VAC relay capacity . . . insensitive to voltage fluctuations.

The Model 580: multi-point indicator permits "flick of a switch" indication of 2 to 10 temperatures controlled by up to ten Model 536 controllers.

These are just the high spots. For *complete* details on this versatile Fenwal family, send for bulletin MC-190, "Smarter Looking Smarter Acting Electronic Temperature Controls." FENWAL INCORPORATED, 259 Pleasant Street, Ashland, Mass.

*Another example of how* **Fenwal** CONTROLS TEMPERATURE . . . PRECISELY



For more facts circle 422 on reader Service Card

*Courtesy Fawick Airflex Corporation*

No more hand tightening!

# ...ROTOR SCREW DRIVER

cuts assembly time 30%

**JOB:** Driving ¼"– 20 Phillips flat-head machine screws in brake segments. Formerly used electric screw driver. Screws had to be hand-tightened after running.

Changed to Rotor S-01 PRC air screw driver at 1600 rpm.

**RESULTS:** Screws now run to uniform tightness. Eliminates hand tightening. Savings of 30% in time pay for tool in 15 weeks. Cuts operator fatigue.

*Ask for demonstration* of this screwdriver and other Rotor air tools to find out how they can cut *your* costs.

*Write for full-line Bulletin 53-C.*

ROTOR AIR TOOLS: Assembly Tools • Drills • Small Wheel Grinders
Straight Grinders • Vertical Grinders • Scalers • Chippers • Rammers
Special Tools • Air Motors

ROTOR HIGH-CYCLE ELECTRIC TOOLS: Grinders • Polishers • Sanders

ROTOR TOOLS

The Rotor Tool Company · Cleveland, Ohio
SUBSIDIARY OF THE COOPER BESSEMER CORPORATION

By PAUL A. KING, Member, New York Bar

# Supreme Court limits lower federal courts

**It's the court's job to decide if arbitration is warranted. And it must decide only on the basis of the arbitration clause—not on the merits of the case.**

## NEWS TIPS

• The union may not care for your negotiator if it thinks he is anti-union. Nevertheless, it cannot refuse to negotiate to force you to get rid of him. The NLRB ordered an ILGWU affiliate to do business with the employer's labor relations consultant regardless of its feelings about her.

• Recent regulations issued under Pennsylvania's equal pay law require keeping records of the name, address, and wage rate of employees for one year. All states have specific regulations covering employees and their pay. For a good run-down of the labor law record-keeping requirements (and other laws as well) of the 50 states, buy the 1040-page "Corporate Records Retention Guide (Vol. 3)" put out by the Controllers Institute Research Foundation, Inc., 2 Park Ave., New York 16. Cost: $20.

• To keep out the union knocking at your door, you can tell workers that economic misfortune may befall them if they invite the union in—provided you don't have the power to make your prediction come true. But you cannot say that two of your biggest customers *have decided* to cut you out if a union enters the scene—unless it is true.

• Some companies pay the employment agency fee of newly hired employees. But some that don't have been telling new workers that the fees are income-tax deductible. Just a few months ago the Internal Revenue Service ruled against such deductions, later reversed itself. They're still deductible.

Too often in the past a federal court has examined an employer-employee grievance and, on the merits of the case, either granted or denied the union's action to compel arbitration—or the company's action to resist arbitration. But now the U. S. Supreme Court has ruled that the function of the court is to see if, on the face of the contract, arbitration is warranted.

In labor relations, arbitration is supposed to take the place of strikes and stoppages. It is supposed to avert the technical and tedious treatment that courts give litigants. For quick and substantial justice without strikes and stoppages, management agrees to submit disputes about contract interpretation to an arbitrator. The union gives up its right to strike and stop.

However, trend of late has been for companies to contend that a particular grievance is not covered by the contract and to refuse to submit to the jurisdiction of the arbitrator. The union's reaction has been to take the company to court under Section 301 of the Labor Management Relations Act to compel the employer to arbitrate.

Instead of confining themselves to interpreting the arbitration clause narrowly to see if arbitration is warranted, federal district and appeal courts have looked into the merits of the grievance. When they finally order or refuse to order arbitration, they have practically rendered a decision which the parties (at least in theory) wanted to leave to the arbitrator when they signed the agreement. But those days have now vanished.

The U. S. Supreme Court has ruled that "the function of the court is very limited when the parties have agreed to submit all questions of contract interpretation to the arbitrator. It is then confined to ascertaining whether the party seeking arbitration is making a claim which is governed by the contract. Whether the moving party is right or wrong is a question of contract interpretation for the arbitrator. In these circumstances, the moving party should not be deprived of the arbitrator's judgment."

The Supreme Court illustrated its reasoning in these two cases:

(1) An employee left work because of an injury. He was granted Workmen's Compensation for a permanent partial disability. Later on, he demanded his job back—under the contract's seniority clause. A U. S. court of appeals at Cincinnati refused to order arbitration. It said the grievance was frivolous and baseless. The Supreme Court said that the parties had agreed to submit all cases involving the interpretation of contract language to the arbitrator; not just those that a court thought were meritorious.

(2) In the second case, matters that were strictly a function of management were supposed to be withdrawn from the grievance procedure, according to the contract. How about subcontracting? Was it strictly a management matter? A U. S. court of appeals at New Orleans said it was. It refused to let the matter go to an arbitrator. The Supreme Court said there was a dispute as to the meaning and application of the contract; referred the matter to an arbitrator.

*Turn the page*

# "We've reduced our scrubbing time from 70 to 7 man-hours ... and our floors have never before been so clean!"

— says Foreman of
BURNY BROS. BAKERY, CHICAGO

## Garage and stockroom floors in Burny Bros. large, modern bakery get daily scrubbing with a *Job-Fitted Combination Scrubber-Vac* and *Setol Cleanser*

*THEY'RE an unbeatable team* to speed the cleaning of oily, greasy floors. *Here's why:* A *Scrubber-Vac* completely mechanizes scrubbing. It applies the cleanser, scrubs, flushes if required, and picks up (damp-dries the floor) — *all in one operation! Job-fitted* to specific needs, a *Scrubber-Vac* provides the maximum brush coverage consistent with the area and arrangement of the floors. Its teammate, *Setol Cleanser,* is specially designed for the greater speed of *combination-machine-scrubbing* ... emulsifies grimy oil and grease *instantaneously* for fast, thorough removal by the machine's powerful vac. Moreover, *Setol* retains its strength longer than average alkaline cleansers. This, too, speeds the cleaning process ... saves on materials ... and cuts operating time of the machine, which in turn reduces labor costs. The *Scrubber-Vac* shown above is *Finnell's 213P,* for heavy duty scrubbing of large-area floors. It's *self-propelled,* and has a 26-inch brush spread. Cleans up to 8,750 sq. ft. per hour (and more in some cases), depending upon condition of the floors, congestion, et cetera. (The machine can be leased or purchased.) *Finnell* makes a full range of sizes, and *self-powered* as well as *electric* models ... also a full line of fast-acting cleansers. In fact, *Finnell makes everything for floor care!* Find out what *you* would save with *combination-machine-scrubbing.* For demonstration, consultation, or literature, phone or write nearest *Finnell Branch* or Finnell System, Inc., 2509 East Street, Elkhart, Indiana. Branch Offices in all principal cities of the United States and Canada.

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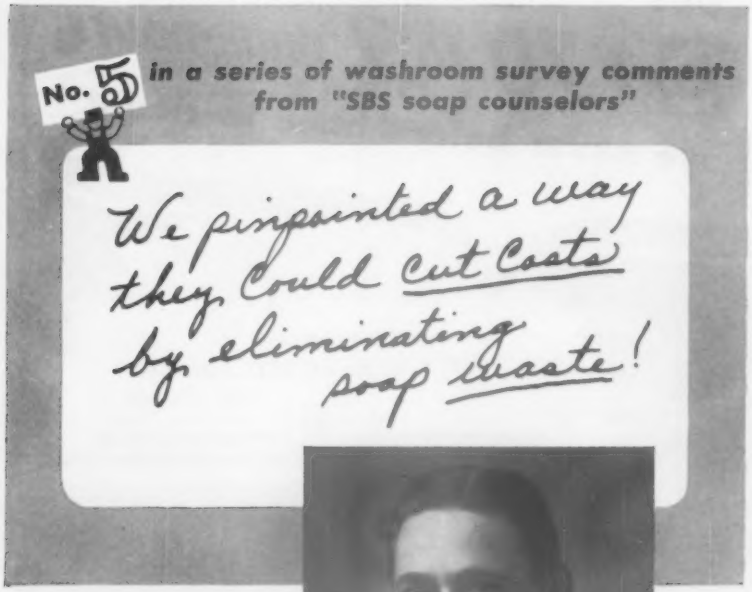
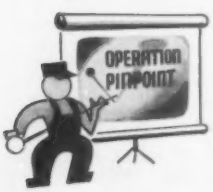

No. 5
in a series of washroom survey comments from "SBS soap counselors"
We pinpointed a way they could cut costs by eliminating soap waste!

Robert Foss, veteran SBS soap counselor in the Wisconsin-Minnesota area, has helped scores of plants find economical solutions to their wash-up and hygiene problems. Here's his report on a metalworking plant employing better than 3800 workers:

"We found this plant's washroom costs way up! The powdered and liquid soaps provided in the washrooms were being wasted by the handfuls. Result: unsightly washbasins, slippery floors, excessive soap and housekeeping costs. In addition, these soaps proved only partially effective against the more irritating, difficult-to-remove soils in the plant.

We showed them how much more *effectively and economically* SBS 60 can do the job. Formulated especially for industrial use, this quick-acting *cream* deodorant soap is virtually impossible to waste . . . is equally safe on face, hands or body . . . and removes *all* the general soils found in this plant."




*Money-saving suggestions* like this *begin* with OPERATION PINPOINT – a thought-provoking presentation filled with facts about skin hygiene and washroom maintenance. The SBS soap counselor serving your area can pinpoint the right soap to do every skin cleansing job best and at lowest cost in your plant. Let him show you OPERATION PINPOINT . . . just call your nearest SBS office, collect.

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SBS sugar beet products co.

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*Begins on page 194*

## Employee discharge

**You can rarely get away with an anti-union bias in discharging an employee—but it does happen.**

The NLRB seldom cares how sound your reason for dismissal may be if it finds anti-union bias. But there have been a few exceptions to this rule. One was made recently when the Petroleum Carrier Corportion of Tampa (Fla.) fired two oil truck drivers because they did not stop at rail crossings. This was a violation of the company, state, and city rules. Despite its detection of an anti-union motive, the NLRB upheld the discharge. It felt that in this case the safety of individuals was of top importance. But, even here, the NLRB might not have upheld the discharge had it been presented with evidence that the company would not have enforced the rule as rigidly against non-union employees.

Another exception was made in the instance of an employee fired for violating a company rule against prying open packing cases. His discharge was also upheld.

## Pre-election prattle

**Sometimes, false statements by a union just before an election may invalidate the election.**

Pre-election prattle (whether by a candidate for the Presidency of the United States or by a union trying to win a representation election) must be taken with a grain or two of salt. And misrepresentation of fact may have no legal effect on a candidate for office. But when a union misrepresents prior to an election, the election may be invalidated—if misrepresentation was so close to the election that the company didn't have a chance to set the record straight.

Less than 24 hours before an election at a certain plant, the union wrote employees to the effect that *all* of the company's fringe benefits were won through collective bargaining and, in many instances, over the initial opposition of the company. This was an important statement to the company for two reasons. First, some days prior to

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Portable stacking racks.
Can be moved within plant or picked up for shipping.

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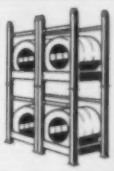
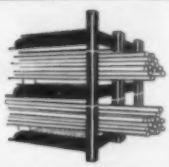


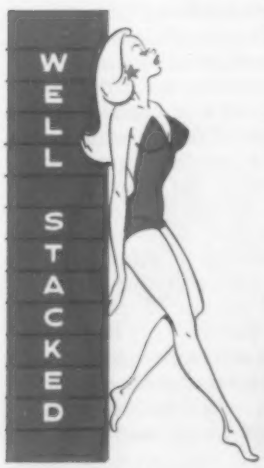
Stock boxes —solid or KD

Bar, pipe and tube racks



Air-Row Head adjustable pallet racks

EMI has the most complete range of storage and material handling racks in the industry. Shown here are examples. If you have a special problem, we will design racks to your exact specifications.

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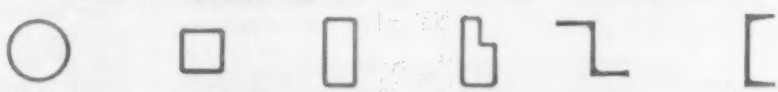


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**OF OIL-SMOOTH PULLING POWER**

**NEW Snap-on Hydraulic Puller saves downtime, cuts costs**

The new SNAP-ON 20-ton hydraulic puller handles hundreds of pushing, pulling and pressing jobs quickly and safely. No more galled shafts — no more damaged parts through heating, prying or hammering. Even the tightest pressed fits are off with a few easy strokes of the handle — downtime can be cut from hours to minutes.

Hydraulic ram is threaded near the top for attachment of various yokes and adaptors for different jobs. Ram and adaptor can be used on the outside of a puller yoke. This is an exclusive feature and provides 6-in. longer reach than competitive units.

Another important feature is the accumulator sack on the pump. It permits operating pump in any position, eliminates back pressure and keeps oil free from contamination.

Ram and pump assembly is available separately or with your choice of a wide range of pullers — combination 2- and 3-jaw yoke-type, bar-type, and floor press, together with wide assortment of adaptors. Many of the SNAP-ON pullers you now have can be used with this hydraulic set. Get full details from your SNAP-ON representative or write for new literature.

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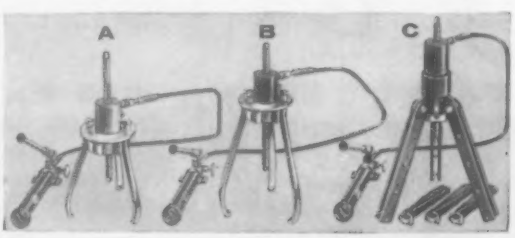



**SNAP-ON CG-420 ram and pump assembly shown with A, the CG-400 puller with 9½-in. reach and 13-in. spread; B, the CG-405 puller with 14-in. reach and 15-in. spread; C, the CG-425 heavy-duty puller with 19-in. reach and 20-in. spread.**




the election, the company made the pitch that the employees didn't need the union to get fringe benefits. Secondly, the company lost by three votes.

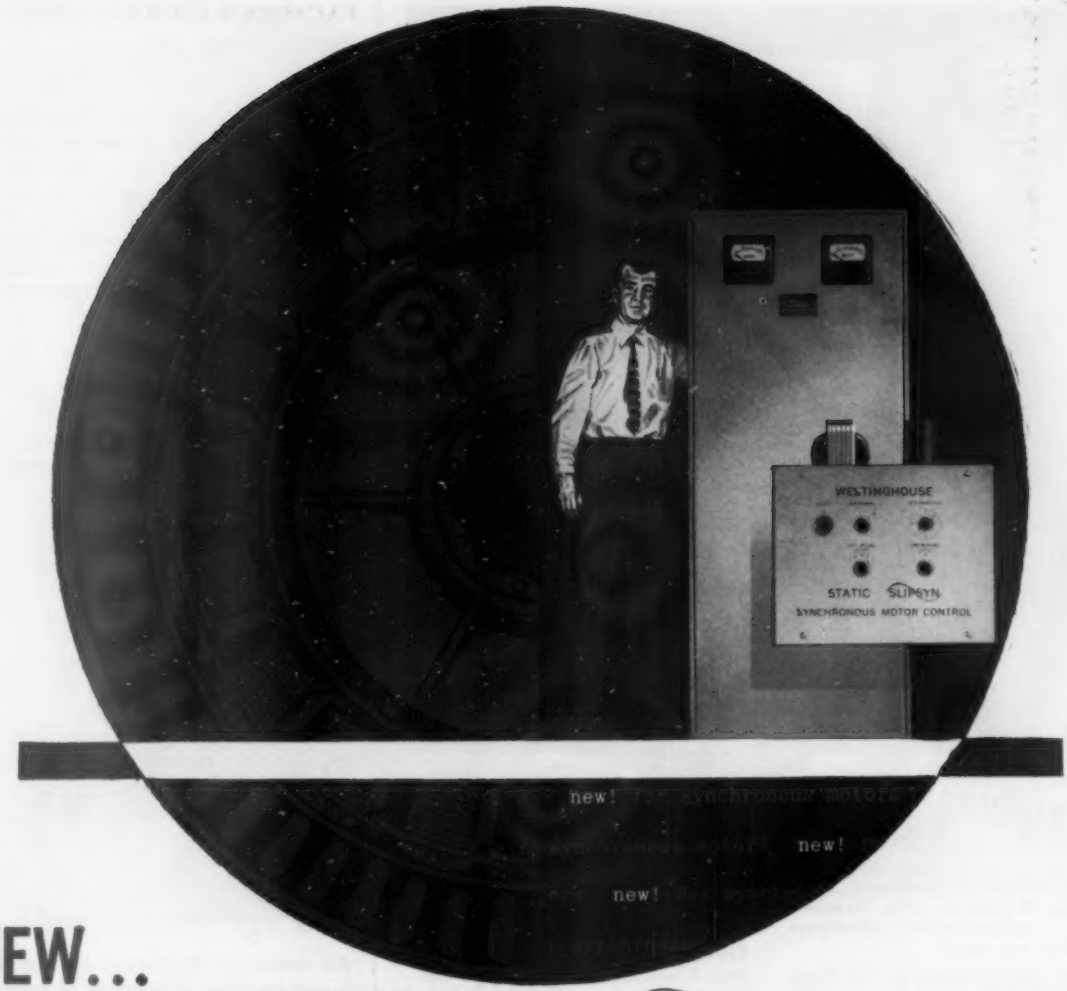
The statement made by the union was not true. But whether or not it was true—and whether or not the company had a chance to answer the union's letter—was of no major concern to the NLRB (which declared the election valid). But later, a federal court upset the Board's decision. Said the court: "Under the facts of this case, it cannot be said that the employees were acting under a correct understanding of the facts with respect to the manner in which employee benefits were gained at the time they cast their ballots. The election must, therefore, be held invalid."

## Post-Election Dispute

**You can't stop informational picketing—even though the union lost a representation election just a short while back.**

A union lost an election to represent the employees. Taking this in stride, it still asked the company to recognize the union. Shortly after that request, it began a campaign of informational picketing. Recognition or organizational picketing after a lost election is now unlawful. But a federal court says that *informational picketing* after a lost election is okay. The issue here: Was it informational when the picketing had been preceded by a lost election and a subsequent demand for recognition? It was, said the court.

Informational picketing is not informational picketing under the law if it has recognition or organization as an objective. Looking at union activities in a practical way, the court commented that there is no picketing that doesn't have recognition of the union as an ultimate object. Continuing, it said: "It is therefore apparent, picketing having an announced purpose of truthfully advising the public . . . that an employer does not employ members of, or have a contract with a labor organization . . . this must be considered without giving undue em-

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## UPS RELIABILITY, VIRTUALLY ELIMINATES MAINTENANCE

STOP PUZZLING over synchronous motor controls . . . here's the advanced way to gain top performance. The all-new Westinghouse Static Slipsyn® control pays its own way by chopping motor control maintenance costs, practically eliminating down time and increasing reliability. Check these advantages:

WESTINGHOUSE STATIC SYNCHRONIZING CONTROL has no moving parts. It uses simple, reliable, transistorized networks instead of conventional relays . . . no contacts, bearings and springs to corrode, wear and fail. Size and weight are greatly reduced—and Static Slipsyn control is immune to contaminated, dusty surroundings.

WESTINGHOUSE STATIC SYNCHRONIZING CONTROL precisely applies motor field excitation at proper speed and pole position up to and including 99% of synchronous speed. Pull-out protection is positive and adjustable to avoid false tripping.

FOR NEW AND OLD INSTALLATIONS. Your Westinghouse salesman will help you apply the completely packaged Static Slipsyn control to synchronous motor installations now being planned. And he can show you how static synchronizing control units can replace the conventional, mechanical relays in your present control enclosures. Either way, Westinghouse Static Slipsyn control saves big money through reduced maintenance, improved reliability, shorter down times.

Contact your local representative or write Westinghouse Electric Corporation, P.O. Box 868, Pittsburgh 30, Pa. J-25001

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You'll like its dependable battery power. Easily sweeps a full shift on a single battery charge (under normal operating conditions).

**Economical.** A real money-saver, too. Electricity usually costs less than other power. Upkeep is less. And an electric sweeper will generally last longer . . . especially when operating under dusty conditions.

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**POWER SWEEPERS**

Model 100 Sweeper cleans 7'4" path

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Model 40 Sweeper cleans 34" path

SPECIALIZED MAINTENANCE EQUIPMENT



phasis to the ultimate object of union recognition." In the case before it, recognition was discussed before the picketing started, but the leaflets were non-organizational in nature—were informational. The court refused to permit this limited discussion of recognition to taint the picketing.

## Unemployment pay

**The state can get back its unemployment pay when an arbitrator awards back pay.**

When an arbitrator orders reinstatement with back pay, less unemployment insurance received by the worker during the period of discharge, keep your fingers crossed that the state won't take a bite out of the award equivalent to the idle pay it doled out. If it does, you can be sure that the employee will beef and another grievance may be filed. The Supreme Judicial Court of Massachusetts approved such recoupment by the state and cited a U. S. Supreme Court decision in support.

## Old age discharge

**An employee discharged for cause is not deprived of his right to retire early, says an Illinois court.**

Perhaps somewhere in your pension booklet—maybe in small print—there is a phrase that pensions do not give the employee the right to employment. This court decision may prompt you to add a sentence to this effect: When an employee is discharged for cause he loses all right to his pension. While this would be the technical interpretation of a pension contract, it won't help you if a court just once decides to be untechnical.

In most plans, the normal retirement age is 65. Early retirement at age 60 is permitted. Suppose an employee is fired for cause at age 60. Is he deprived of his right to retire early with pension? No sir, said an Illinois appellate court. It rejected the company's point of view that the plan said only *employees* were entitled to pensions and that this individual was not an employee be-

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**Wil-Gard Neoprene is one of 10 quality lines — 70 different styles and compositions — by the Wilson Rubber Company. The Wilson Catalog gives complete information and provides a handy chart to assist in picking the proper glove for your particular application. Write to Wilson today, or contact your distributor.**

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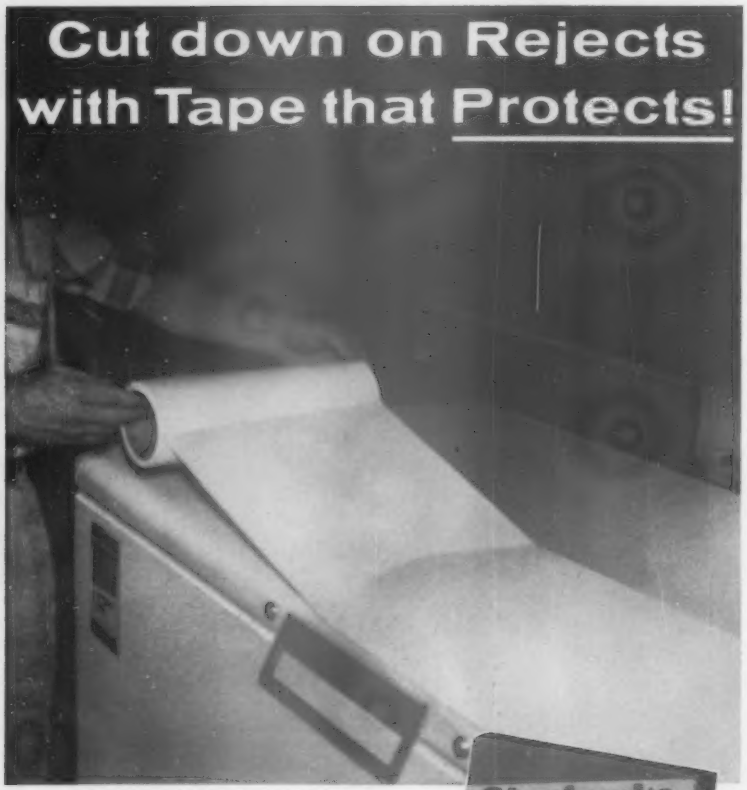


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**SHURTAPE®**
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Scratches, mars, or stains on polished and finished surfaces are costly — causing rejections in your plant and a higher rate of customer returns. That's why it *pays* to protect these surfaces from damage during fabrication, storage, and shipment — with Shuford's SHURTAPE FP-71.

This pressure-sensitive tape has a rubber-impregnated, white flat paper backing that combines strength with great flexibility. It conforms easily to flat or curved surfaces, adheres instantly, and strips clean, leaving no stain or deposit. Can be printed with distinctive marks for identification.

Used during manufacture, FP-71 permits clean drilling or sawing without fouling tools.

SHURTAPE FP-71 provides excellent protection from abrasion, water, stains . . . it also resists solvents and oils. Use it on all your polished and finished surfaces . . . it's a low-cost precaution that pays off!

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*Begins on page 194*

cause he had been discharged for cause and in good faith.

The issue came up when the Chicago Transit Authority fired a 60-year-old conductor after the company had investigated charges by two passengers of larceny. No criminal charge was brought nor did the worker contest his discharge. But after he was fired he requested his pension. Under the Transit Authority pension plan an employee could retire early—after age 58. The Authority resisted the ex-conductor's demand, claiming that he was not an employee—by reason of his own wrongful conduct—when he asked for his pension. But the appellate court didn't go along with the Authority. "This retirement plan was a collective bargaining agreement, and we believe that plaintiff had a vested interest . . . and was entitled to its benefits upon satisfying the requirements as to age and service. The plan contained no provision for his disqualification in the event of involuntary separation." This worker's early retirement rights had matured at the time of his discharge, was the court's conclusion.

## Punishment for theft

**For stealing a half can of paint, this employee was fired. The penalty was too stiff, said the arbitrator.**

To support its discharge of an employee for a minor theft, the company argued that there were no degrees of morality. The union argued that the stolen can was of negligible value and, therefore, the penalty should be minor. The arbitrator went right down the middle—said that a stiff penalty was warranted since pilfering was of great concern to the company. It had reached serious proportions. But discharge was too harsh a penalty—a 2½-month layoff was just right.

## Negotiating warning

**Today's cheap settlement may be tomorrow's cross to bear.**

The lure of a cheap and quick settlement may be attractive to negotiators, but may be more costly in


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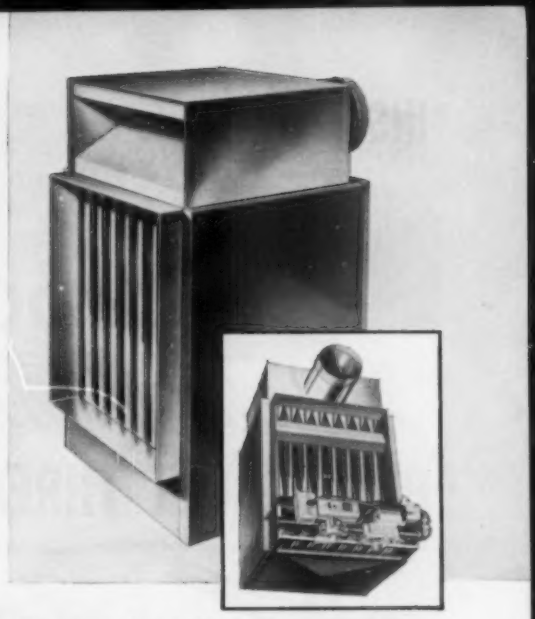

**Duct heater** is suitable for downstream operation in accordance with latest codes. Provides heating cycle for remote cooling units, such as the TRANE Self-Contained Air Conditioner. Drain pan (shown in inset) is standard equipment. The unit has low static resistance, is of aluminized construction. Operational modulation valve reduces input as much as 80%. 2-stage, 2-input valve available.

**Propeller-type heater** uses a new, quiet TRANE Fan that is designed exclusively for unit heaters. Access door on bottom of casing makes unit easy to clean. Complete range of sizes from 33,000 to 250,000 Btuh input.

# New Trane gas-fired heaters have advanced styling, compact design!

## *High-performance blower and propeller units—plus duct models approved for downstream operation*

Here's a new line of gas-fired heaters from TRANE that combines smart, modern appearance with peak performance and versatility! These TRANE Heaters are ruggedly built for long life—yet they're light in weight, compactly designed for use where space is at a premium.

Three basic types are available: propeller, duct and blower. All models feature an aluminized steel, all-welded heat exchanger that assures long, trouble-free operation. The steel, ribbon-type burners have stainless steel inserts. And the burners are removable individually for service and maintenance.

The TRANE Duct Heater may be used for downstream operation, for use with remote cooling units (such as the TRANE Self-Contained Air Conditioner). All parts of the duct heater that are exposed to the cold air stream are of aluminized construction—including the drain pan, which is standard equipment.

True 2-speed, 2-input propeller units available in 5 sizes. The motor speed and gas input can be automatically cycled to maintain more even temperatures; to provide greater operating economy.

The light weight of these new TRANE Heaters means more Btu's per pound. Freight costs are lower; and installation is simplified: minimizes the need for expensive structural reinforcement.

WANT MORE FACTS on these gas-fired heaters? Just ask your nearby TRANE Sales Office; or write TRANE, La Crosse, Wisconsin.

**Blower-type heater** uses a forward-curved centrifugal fan. Free delivery or duct work installation; adjustable fan belts to provide proper air delivery against varying static pressures. Streamlined fan inlet for exceptionally quiet operation. Louver-Fin Diffusers increase air throw. Sizes from 33,000 to 250,000 Btuh input.

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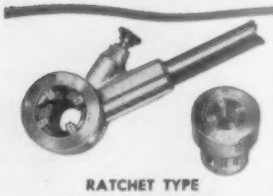
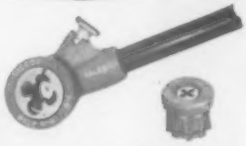


RATCHET TYPE
For ⅛" thru 2" PIPE

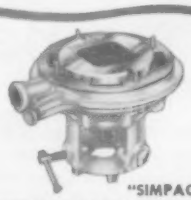


RATCHET TYPE
¼" thru 1" BOLT STOCK

3-WAY
For ⅜", ½", ⅝",
or ¾", ⅞", 1" BOLTS

3-WAY
½" SIZE TO 1" PIPE STOCK

CAM-TYPE DIE HEADS
to 2" PIPE SIZES thru 1½" BOLTS



"SIMPACT"
RATCHET: 1" to 2" PIPE SIZES

### NEW, Advanced Features

When you're looking for just the right Threader to do the job better, faster, and still give you long dependable service to help you increase your job-profit dollars — INSIST ON TOLEDO! Here are a few of many Toledo Quality Built and Quality Checked TOLEDO TOOLS at popular prices. Get extra value . . . advanced design and Toledo engineered mechanical features . . . at no extra cost, see and buy Toledo Tools!

(SOLD THRU AUTHORIZED "TOLEDO" DISTRIBUTORS)

Write For New Catalog

TOLEDO® *Quality Checked*

PIPE THREADERS • WRENCHES • MACHINES • TUBING TOOLS

THE TOLEDO PIPE THREADING MACHINE CO...TOLEDO 3, OHIO

 For more facts Circle 498 on Reader Service Card

# REMOVE COILS FROM PALLETS QUICKLY & EASILY

- Safe
- Labor-Saving
- Efficient
- Won't Damage Material!
- Self-Contained
- Automatic
- Portable

**Sizes to handle loads from 3,000 to 40,000 pounds. Prices start at $2000.**

Fork truck sets palletized coils on bed of cradle.

Cradle tips backward as base rotates.

Cradle nears end of 90° backward tip as it is finishing its 180° rotation.

Coils, now off pallet, face truck and are ready to fork.

## turnover cradle

A Product of LA DEAU MANUFACTURING COMPANY
2702 San Fernando Road, Los Angeles 65, California
Telephone CApitol 2-8108

For more facts Circle 499 on Reader Service Card

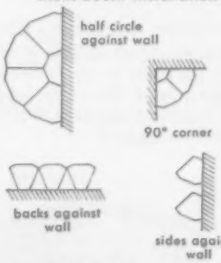
# ALWAYS "WHISPER QUIET" IN BURGESS-MANNING PHONE BOOTH!

Acoustically efficient . . . there's no noise in . . . no conversation out . . . in the Burgess-Manning "Hear-Here" Acousti-Booth, regardless of all noise around you.

Easily installed — no maintenance . . . air is always fresh, no corners to sweep, no glass to break, no hinges to stick.

Compactly designed, in silver gray hammer finish, Burgess-Manning Wall Model 45 "Hear-Here" Acousti-Booth has "theft-proof" phone mounting. Easy, quick booth mounting with side or back brackets.

**New Triangular Design for Space-Saving Multi-Booth Installation**



**Send for Bulletin No. A-142-4T** for full details of Model 45 "Hear-Here" Acousti-Booth. Other models also available.

BURGESS-MANNING COMPANY
*Architectural Products Division*
749 East Park, Libertyville, Ill.

For more facts Circle 500 on Reader Service Card

the years to come, the NAM points out. It reports that two New York manufacturers with 5000 employees agreed to assume their employees' obligated share of social security tax either in part or in whole. The NAM fears that if the social security tax base is increased from $4800 to $6000, the employer may then have to absorb the higher tax since a precedent has been set.

From a broader point of view, the NAM reminds its members that when the employee shares tax responsibility with management, he also shares concern about tax increases and tends to work toward keeping the tax burden down. Company absorption of the tax would destroy this inclination.

## Christmas bonuses

**It may be too early to talk about Christmas bonuses, but if there is any possibility of your cutting them out this year for the first time, you may want to get your contract ducks in order early.**

Come the end of the year and business slackens, management may want to trim the usual Christmas bonus. The question: Can the union stop you if, for years, you have been doling them out?

The union's argument is based generally on past practice—that a benefit enjoyed for years by employees cannot be taken away from them without bargaining with the union. However, there is arbitrator precedent that gives the employer the right to cut down the bonus over union objection. In one case, the company had been giving a bonus since 1936, but trimmed the amount down in 1959. The arbitrator looked on the bonus as a gift and not as a contract right. He pointed out that the contract was quite detailed on the subject of fringe benefits and that the Christmas bonus was not included.

*(Selected items in this Labor Relations News section are developed from full citations published by the Bureau of National Affairs, Inc., Washington, D.C.)*

*Copyflex One-Writing System Cuts Production Order Writing up to 90%!*

With modern Bruning copying machines, information for ordering and reordering parts, sub-assemblies, and final assemblies is written only once.

Process Engineering enters manufacturing information on a combination production order and operations sheet, printed on inexpensive translucent paper. A reproducible copy – made by Copyflex on easy-to-erase matte film – is used over and over again by Production Control for reproduction of orders and all related records.

To re-issue orders, Production simply changes the variable order information on the film and makes Copyflex copies (white or colored) to serve as new production orders, material requisitions, travelers, etc. No rewriting or proofreading. And because Process Engineering holds the original operations sheet, *only latest manufacturing information is used for production.*

Best for business systems, Copyflex machines are flexible and economical – letter size copies cost only a penny each for materials. You owe it to yourself and your company to investigate Copyflex savings by mailing the coupon.

BRUNING Copyflex

Charles Bruning Co., Inc. Dept. 9-Q
1800 Central Rd., Mt. Prospect, Ill.
Offices in Principal U. S. Cities
In Canada: 103 Church St., Toronto 1, Ont.

☐ Please send me information on Copyflex for Production Control.

Name _____ Title _____
Company _____
Address _____
City _____ County _____ State _____

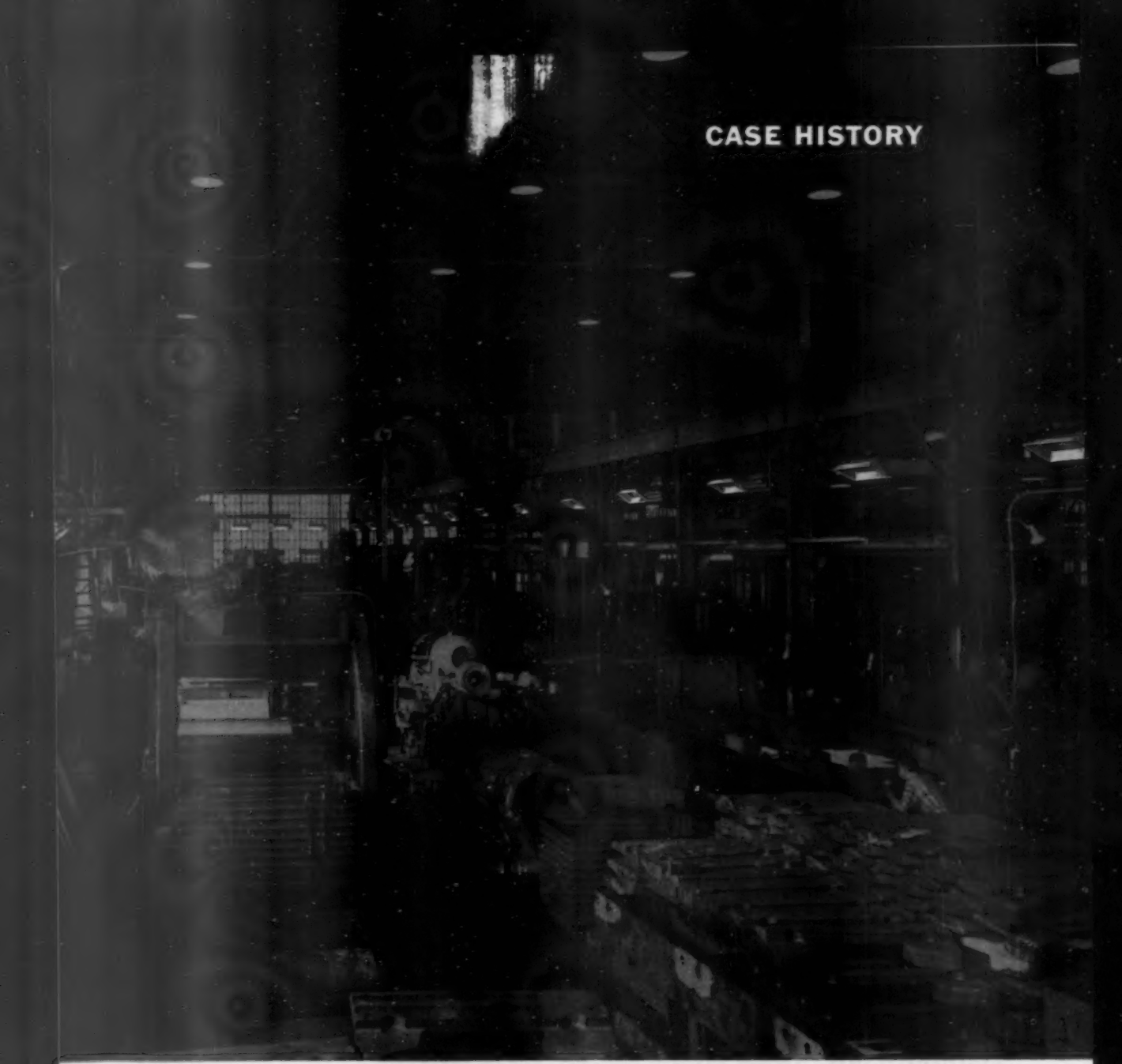
PERFECTION **Infra-Red GAS Heaters** SCHWANK

Startling savings of $9892 in fuel costs in one year's operation plus a wonderful new kind of heating comfort are big reasons Perfection Schwank Gas Infra-Red Heaters rate high with Youngstown Foundry and Machine Company, Youngstown, Ohio. Listen to these comments:

"Heating a 60 year old building like this is a tough job", states James Paumier, Plant Superintendent, "but this Perfection Schwank system gives us a constant and comfortable 65° temperature, drastically cut our fuel cost and requires practically no maintenance."

Wayne Thew, Foreman, exclaims, "I've been here for 20 years and Perfection Schwank Infra-Red is far superior to any other heating system we've tried. Castings and machinery are

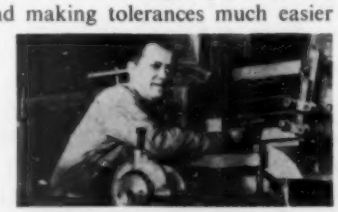
**For more facts Circle 502 on Reader Service Card**




Part of the 41,160 square feet of floor space at Youngstown Foundry and Machine . . . all heated by Perfection Schwank Gas Infra-Red Heaters.

# cut heating bill $9,892 . . . give Youngstown Foundry and Machine "Best Heat Ever!"

*always* the same temperature eliminating expansion and contraction problems and making tolerances much easier to meet."



States Joseph Sagy, Plane Operator: "Since we've had these Infra-Red heaters, there are no drafts, no hot and cold spots . . . in every way they're a big improvement over our previous heating system."

Acceptance like this makes it easy to understand why there are over 25,000 users of Perfection Schwank Gas Infra-Red Heaters.

***Approved by A.G.A., Underwriters, C.G.A. and C.S.A.***

Under Schwank U.S. Patents 2,775,294 and 2,870,830 and pending applications.

**PIONEERS IN GAS INFRA-RED HEATERS**

**PERFECTION** 1135 Ivanhoe Rd., Cleveland 10, Ohio

division of **Hupp Corporation** / licensee of **American Infra-Red Radiant Co.**

FACTORY

# IDEAS OF THE MONTH

By LEWIS K. URQUHART, Consulting Editor, FACTORY

(For more information, circle item numbers on Reader Service Card next to back cover)

**No time to read?** But you have to—if you want success. So—better circle No. 236 for your copy of "How to cut your reading time" (*McGraw-Hill*). Tells how you can acquire "phrase circling" and other time-saving habits, extols benefits of "pre-reading," emphasizes need for good environment. **(236)**

**Swench** is what they've named a manual impact wrench (*Curtiss-Wright*). And "they" (which includes our own maintenance expert) say it's the first one that really works. So don't burn that nut off. Swench it off! **(237)**

**Polyolefin tubing** and sleeving material named Hyshrink (*Sequoia Wire & Cable*) can be slipped easily over terminals, connectors, wire and cable, conduit, hose. Heat (275 F.) shrinks it to form strong mechanical bond. **(238)**

**Tool-steel users** can pick and choose faster, better—and slash inventories—through new Steelector Program (*Allegheny Ludlum*) which presents 18 grades that will handle 96% of all tool-steel applications. **(239)**

**Booklet of Month** had better be "Blueprint for Industrial Survival" (*OCDM*). Describes nerve center at remote rural location from which Standard Oil Co. (N. J.) could operate in extreme emergency. **(240)**

**Miniature power screwdriver** (*Foredom Electric*) doubles as nutrunner. Driven by flexible shaft. Handpiece weighs only 5 oz. **(241)**

**Open steel plank** (*Dexion*) is a brand-new standard unit that combines with slotted angles to provide ramps, catwalks, mezzanines, etc. Single-bolt fixing plate for easy, speedy assembly. **(242)**

**Natural White** is newest fluorescent (*Sylvania*)—with the mostest red light radiation. Makes merchandise, surroundings, and even people look more attractive. How about your offices? Or your cafeteria? **(243)**

**Sub-miniature,** quarter-turn, quick-release fasteners (*Camloc*) are the nuts for light covers, small subassemblies, miniature "black boxes." **(244)**

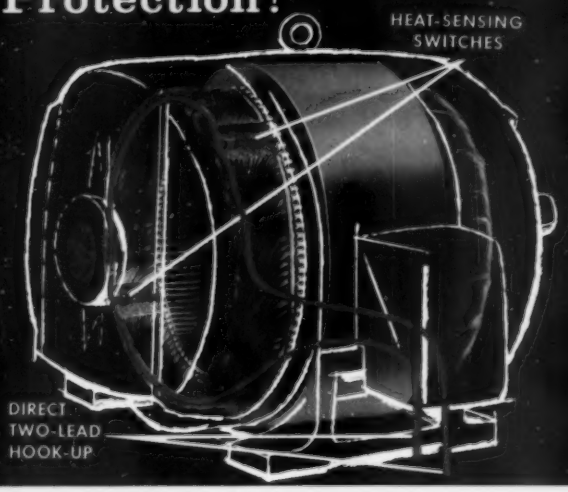
**Do's and don't's of filing,** also ABC's of alphabetizing, are neatly and pithily set down in "Bright Ideas to Make Bright Girls Shine at Filing" (*Avery Label*). That bright girl who files for you rates a copy. **(245)**

**Rigid Koroseal conduit** (*B. F. Goodrich*) is what the doctor ordered for unusual corrosive conditions. Can be cut with ordinary handsaw, bent easily after heating, snaked quickly into place. **(246)**

GENERAL ELECTRIC

# New Concept in Motor Protection!

## Tri-Clad '55' Thermo-Tector SYSTEM ENDS OVERLOAD BURNOUT!




General Electric offers a *totally new* type of protection on *all* Tri-Clad '55' motors 7½-125 hp!

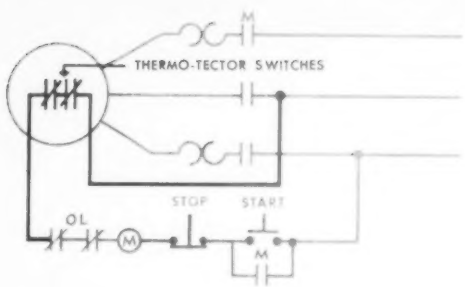
Exclusive **THERMO-TECTOR** system has heat-sensing switches buried in stator windings. Switches shut off motor *only* when stalls, overloads or other conditions threaten heat damage to motor windings.

Unique **THERMO-TECTOR** system "anticipation" feature varies motor shut-off point according to rate of winding heat rise. This flexibility allows *maximum motor output* under all conditions.

TURN PAGE FOR FURTHER INFORMATION

# NEW Tri-Clad® '55' THERMO-TECTOR SYSTEM

## Allows Full Motor Output— No Wasteful "Safety Margin" Needed




**Thermo-Tector system needs *no costly amplifying relays*, connects directly to any G-E motor controller.**

You get full output from Tri-Clad '55' motors with Thermo-Tector system. Variable response feature of heat-sensing switches allows motor to operate right up to safe limits under any operating condition.

Thermo-Tector switches are offered on *all* Tri-Clad '55' motors in frames 254U-445U. For more information, contact your G-E Apparatus Sales Office or write for Bulletin GEA-7092, Section 866-03, Schenectady 5, N. Y.

SMALL AC MOTOR & GENERATOR DEPARTMENT

GENERAL ELECTRIC

**Photodrawings** could be your answer to high cost of conventional engineering drawings. As name implies, they're combinations of photographs and line drawings. Booklet (*LogEtronics*) explains process. **(247)**

**Closed-circuit TV** for minimum investment of $595 (system utilizes conventional receivers). That's the clincher in brochure (*Argus*) titled "How to use Direct-Wire TV as a Tool of Business and Industry." **(248)**

**Don't buy a magnifier**—until you've seen booklet (*Bausch & Lomb*) that describes some 65 models—readers, folding pocket magnifiers, loupes, surface comparators, enlarging focusing magnifiers, etc. **(249)**

**Any questions about home-study schools** for employees? See new guide (*National Home Study Council*) to background and selection. **(250)**

**Space-saving trapezoid shape** is something you'll be sure to like about newest water cooler (*General Electric*). Drinkers can quench thirst from front or either side (no protruding posteriors to block traffic). **(251)**

**Heat-treat baskets** (*Ipsen*) are designed primarily for use with controlled-atmosphere and vacuum units. Loaded trays can be stacked; loop and sleeve combination at ends locks them for handling as single unit. **(252)**

**Snow trouble last winter?** Don't get caught again. Be ready this time with new two-way Snowthrower (*Jari*). What we especially like about it: Fan and chute can be reversed simultaneously—with one hand. Clears 20-in. path, can remove 520 shovelfuls per minute, throws up to 30 feet. **(253)**

**An anchoring device** you'll go for—if you're looking for one to use in concrete—is Thunder Bolt (*Universal Fastenings*). It's cadmium-plated, comes in one piece. Holding power of ¼-in. size: 1500 lb. **(254)**

**Slide-rule weight calculator** for cold-rolled strip steels (*Uddeholm*) gives you both metric and inch-pound readings. **(255)**

**Extra-depth hole saw kit** (*Thompson*) is sure to elicit three cheers from any hole-cutting maintenance man. With it he can cut entrance holes up to 2½-in. deep for standard pipe sizes up to 2-in. in diameter. **(256)**

**Water a headache?** Brochure (*Hall Labs*) covers whole range of industrial water problems—from pre-treatment to disposal. And highlights need for water management to assure lowest costs. **(257)**



*Turn the page*

**Newest 1000-watt mercury lamp** (*General Electric*) offers you savings of more than 20% in cost of light. Bonus Line lamps give you more light at 12,000 hours than old ones gave at 6000. **(258)**

**Facts about weatherstripping**, interior and exterior, against dust, noise, drafts, leaks, light. New booklet (*Pemko*) tells all. **(259)**

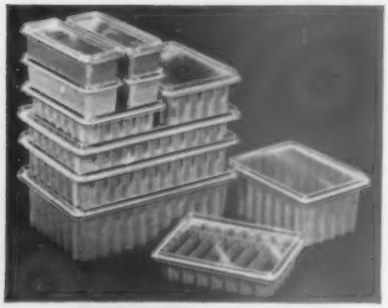
**Safer and faster way** to handle pallets by crane is to slip pallet bars under them (*Calumet Steel Castings*). Bars come in 32-, 38-, 44-, and 50-in. lengths. High-strength cast-steel hooks. Chains can't slip. **(260)**

**Escaveyor** is newest continuous vertical conveyor (*Standard*) for high-speed lifting and lowering. Saves space because platforms switch from horizontal to vertical on return side. Self-loader and unloader. Designed for vertical service, but readily adaptable to horizontal movement. **(261)**

**You, too, can plastic-bind** reports and manuals—with new desk-top plastic punching and binding machine (*American Photocopy*). See booklet for checklist of ways to use colorful plastic binding in your business. **(262)**

*Turn the page*

**For Greater Production and Storage Efficiency**



COVERS—REGULAR OR SNAP-ON

DIVIDERS AS REQUIRED

LABEL PADS

PADS AND HOLDERS

*use* **NEW** *all-purpose*

**P-C PRODUCT CONTROL BOXES**

Made of tough, durable, lightweight co-polymer. Clear butyrate covers. Polyethylene dividers optional. For almost anything solid or liquid—small metal or plastic precision parts, food, oils, chemicals, etc. Long-lasting, resistant to dirt, damage, aqueous acids, alkalies and salt. Easy to stack. Exceptionally low quantity prices. Immediate delivery of standard sizes from stock.

★ SPECIAL FIRST ORDER BONUS OFFER ★
Write for complete information and price list—

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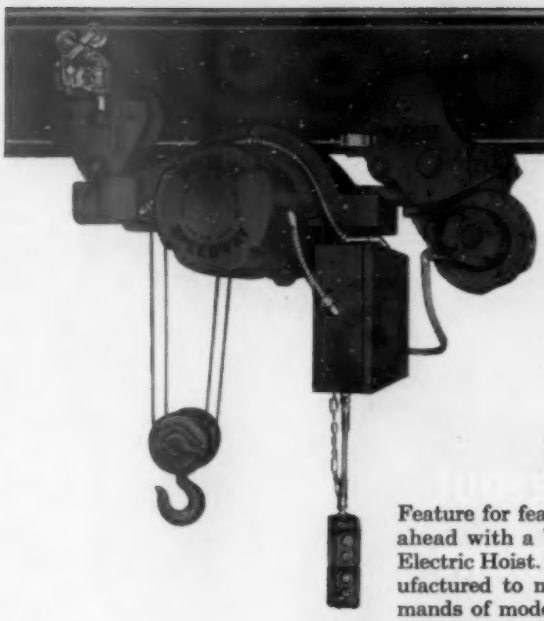
**MR. INDUSTRIALIST**

A NEW PLANT SITE
*In the HEART of INDUSTRIAL AMERICA*
GREENVILLE, PENNSYLVANIA

| DO YOU REQUIRE | YES | NO |
|---|---|---|
| Location MIDWAY between PITTSBURGH, CLEVELAND and ERIE | ☐ | ☐ |
| Served by FOUR MAJOR RAILROADS | ☐ | ☐ |
| Unlimited ELECTRIC POWER and NATURAL GAS SUPPLY | ☐ | ☐ |
| Municipal-type WATER SERVICE, SEWAGE DISPOSAL FACILITIES | ☐ | ☐ |
| IDEAL HOME SITES | ☐ | ☐ |
| Modern SCHOOLS and Liberal Arts COLLEGE | ☐ | ☐ |
| Excellent RECREATIONAL OPPORTUNITIES | ☐ | ☐ |
| **DO YOU REQUIRE** | | |
| ★ ★ FOR LEASE Industrial type building — Rail Siding Sprinklered — 30,720 Sq. Ft. — 13' 2" Clearance | ☐ | ☐ |
| ★ ★ ★ FOR SALE or LEASE Industrial type building — Rail Siding Sprinklered — 25,000 Sq. Ft. — 14' Clearance | ☐ | ☐ |

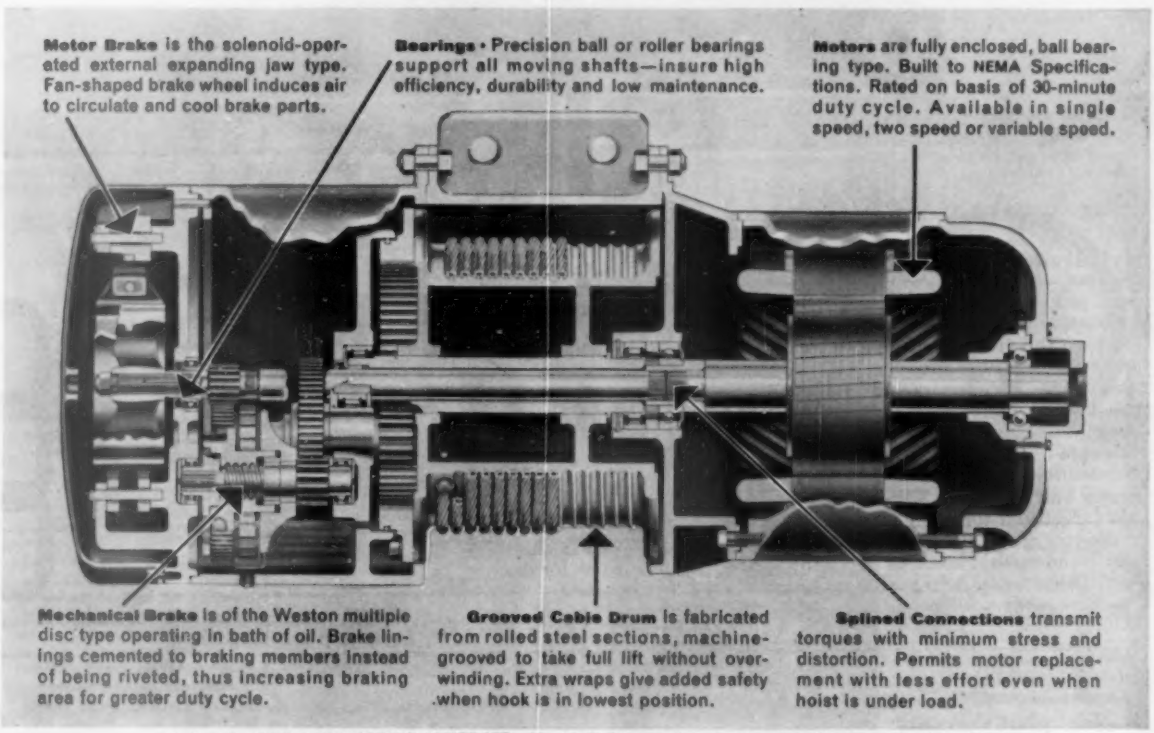
All YES Score indicates you should write for FREE booklet and further information to:

**REYNOLDS DEVELOPMENT**
ROBERT B. PARKER, JR., Managing Engineer
P.O. Box 606 Greenville, Pa.



# You Can't Buy a Low-Priced Hoist with the Outstanding Performance and Maintenance Features You Get as Standard Equipment from Wright

Feature for feature, you are years ahead with a WRIGHT *Speedway* Electric Hoist. Designed and manufactured to meet the varied demands of modern high speed production, *Speedway* Hoists give you the safety, adaptability, ruggedness and efficiency which you can't get in a low-priced hoist. Many of these performance and maintenance features are exclusive with WRIGHT. So if you are considering the purchase of an electric hoist, it will pay you to investigate the advantages of WRIGHT *Speedway* Hoists. For complete information, write our York, Pa., headquarters for **Catalog E-58.**


**Motor Brake** is the solenoid-operated external expanding jaw type. Fan-shaped brake wheel induces air to circulate and cool brake parts.
**Bearings** • Precision ball or roller bearings support all moving shafts—insure high efficiency, durability and low maintenance.
**Motors** are fully enclosed, ball bearing type. Built to NEMA Specifications. Rated on basis of 30-minute duty cycle. Available in single speed, two speed or variable speed.
**Mechanical Brake** is of the Weston multiple disc type operating in bath of oil. Brake linings cemented to braking members instead of being riveted, thus increasing braking area for greater duty cycle.
**Grooved Cable Drum** is fabricated from rolled steel sections, machine-grooved to take full lift without overwinding. Extra wraps give added safety when hook is in lowest position.
**Splined Connections** transmit torques with minimum stress and distortion. Permits motor replacement with less effort even when hoist is under load.

*In Canada:* **UPTON, BRADEEN & JAMES LTD.,** Montreal, Ottawa, Toronto, Hamilton, Windsor, Winnipeg, Vancouver

***See your WRIGHT Distributor*** *about the Speedway Electric Hoist line in the ¼ to 10-ton capacity range*

# WRIGHT HOISTS

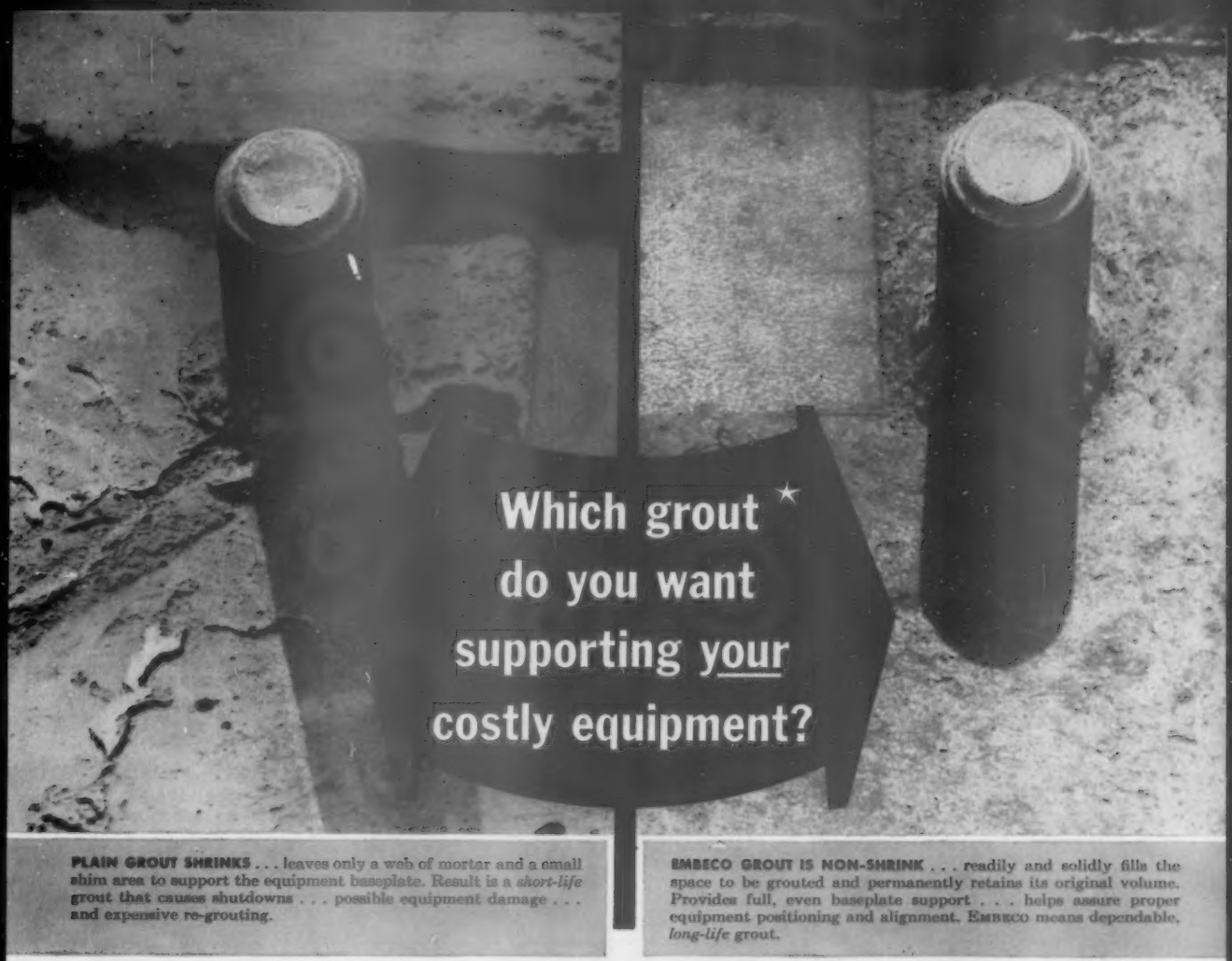
**Wright Hoist Division • American Chain & Cable Company, Inc.**

York, Pa., Atlanta, Chicago, Denver, Detroit, Houston, Los Angeles, New York, Philadelphia, Pittsburgh, San Francisco, Bridgeport, Conn.

ACCO



For more facts Circle 505 on Reader Service Card




**PLAIN GROUT SHRINKS** . . . leaves only a web of mortar and a small shim area to support the equipment baseplate. Result is a *short-life* grout that causes shutdowns . . . possible equipment damage . . . and expensive re-grouting.

**EMBECO GROUT IS NON-SHRINK** . . . readily and solidly fills the space to be grouted and permanently retains its original volume. Provides full, even baseplate support . . . helps assure proper equipment positioning and alignment. EMBECO means dependable, *long-life* grout.

Today's figures show that *machinery* for the average U. S. factory costs $4,680,000[1] — a sizeable, important investment geared toward smooth, efficient production. But the *grout* under this valuable equipment *costs only pennies* by comparison.

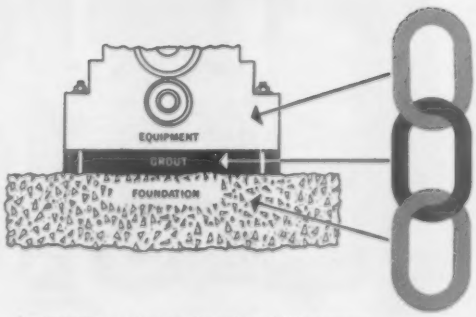
Compare the grouts pictured above. It's clear evidence that EMBECO can save *you* costly re-grouting and production downtime.

*Here's why* EMBECO means a superior grouting job every time—

- **Non-Shrink** . . . assures tight, level, permanent contact with equipment baseplate.
- **Flowable** . . . quickly, completely fills the space, increases ease of placeability.
- **Strong and Tough** . . . withstands impact, pounding action, vibration, side thrust and torque . . . maintains perfect alignment.

Before *you* grout another piece of heavy equipment—call in the local Master Builders field man for full information, or write to us for details on how EMBECO can help you *grout for good.*

[1]*U.S. average*—initial *machinery and equipment costs for new factories.*




★**GROUT** . . . is the "vital link" between equipment and foundation.

*The Master Builders Company • Cleveland, Ohio*
*Division of American-Marietta Company*
*World-wide manufacturing and service facilities*

**Our 50th Year**

# MASTER BUILDERS®
# EMBECO*

*EMBECO *is a registered trademark of The Master Builders Co. for its specially-prepared, flowable, non-shrink grouting products.*

E-2005

**Ball and roller bearing users**—especially those aspiring to more accurate inventory control—will want a copy of new Identification Code (*ASA*) which identifies each bearing on basis of dimensional and functional interchangeability. Covers 80% of total U. S. production. **(263)**

**Electronic inspector** (*Atronic*) detects imperfections that cause as little as 3% variation in reflected or transmitted light, removes imperfect items from conveyor lines moving at speeds up to 600 fpm. **(264)**

**Automatic hose reel** (*United Specialties*) will hold 25 ft. of hose for suspended air guns, tools, etc. Spring-operated drum locks for each 170 deg. of turn, is easily reversed by a relaxing pull on the hose. **(265)**

**Heavy-duty carpet sweeper** (*Bryn Mawr*) is Johnny-on-the-spot for dry spills, quick once-overs. Floating-brush action adjusts to pile height. **(266)**

**Time-speed recorder** (*Annis*) monitors automatic equipment, shows up hidden trouble in machine operations and processes. Split-second timing spots malfunctions often missed by stopwatch studies. **(267)**

Lewis
UNITIZED ASSEMBLY CONTAINERS
FOR
• ASSEMBLY
• PRODUCTION
• STORAGE

Lewis Plastibox containers are one-piece molded plastic. They are smooth, strong, non-corrosive, easily cleaned. Colors, either green or yellow, are molded-in. Plastibox containers stack securely and afford maximum storage of small parts. Sizes available are 8½" long x 5" wide x 4½" deep, 6"x3½"x2½", 3"x3½" x 1¾", and 3"x3½"x1¾" with a vertical divider.

MOUNTING RAILS–Rails are supplied in 18" and 36" lengths to mount 4 or 8 of the 3 smaller Plastibox containers; 3 or 6 of the largest size. Rails afford a wide variety of bench or wall arrangements for any assembly or storage operation.

MOBILE TRUCK ASSEMBLY–These Lewis trucks handle all sizes of Plastibox containers and allow the boxes to be quickly and easily moved from one area to another. Trucks furnished with 36" mounting rails, two swivel and two rigid casters, and are finished in grey enamel.

G.B. Lewis COMPANY
WRITE TODAY
for complete information and brochure
129 Montgomery Street • Watertown, Wisconsin

For more facts Circle 507 on Reader Service Card

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HEUER
(Say "Hoy-er")
Guarantees 85% Greater Legibility!
Makes the most important breakthrough in stopwatch design in 50 years!
Now . . . with the great new EXCLUSIVE central minute register, Heuer gives 85% greater legibility than any other timer on the market.

FREE! Write for latest, complete Century Timer Line Catalogue featuring the world's largest selection of fine timers. Special 10 day FREE TRIAL OFFER included.

Guaranteed Repair Service on all makes of fine timers and chronographs. Free estimates — no obligation.
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OX 7-2150

For more facts Circle 508 on Reader Service Card

# REPUBLIC STEEL LOCKERS

## ...top Quality with Economy

Republic Steel Lockers offer industrial management decided advantages in service and economy.

Big and roomy—interiors are well designed for convenience and ventilation. Strong and sturdy—made of steel to assure complete protection of personal effects and tools. Heavy-duty construction throughout.

*Bonderized!* This exclusive Republic feature provides a superior base for the baked-on enamel finish. Offers protection against rust and corrosion. Restricts bumps, scratches, abrasions of everyday service to the site of the injury. Reduces maintenance costs to a minimum.

Republic Steel Lockers are available with any of the popular locking devices. Handle is attached with a tamper-free Gulmite screw and lockwasher. Practically pilfer free.

Call your Republic-Berger representative. He will help you with your locker planning and assume full responsibility for complete installation.

### QUALITY CONTROL CHART

- ✓ ALL PARTS BONDERIZED
- ✓ 16-GAGE FORMED CHANNEL FRAME
- ✓ CONTINUOUS DOOR STRIKE
- ✓ POSITIVE AUTOMATIC LOCKING
- ✓ TAMPER-PROOF LATCHING
- ✓ ALL PARTS FLANGED FOR STRENGTH
- ✓ SIDES AND BACKS INTERCHANGEABLE
- ✓ DOUBLE LEAF PIN STYLE 2″ HINGE
- ✓ BOLTS AND NUTS ZINC PLATED
- ✓ ALUMINUM BALL-POINT HOOKS
- ✓ BAKED-ON ENAMEL FINISH
- ✓ QUIET OPERATION
- ✓ SNAG-PROOF CONSTRUCTION
- ✓ ENGINEERED VENTILATION
- ✓ POSITIVE LATCHING
- ✓ LOW MAINTENANCE

*OK for purchase*

**CALL YOUR REPUBLIC-BERGER REPRESENTATIVE, OR WRITE...**



For more facts Circle 509 Steel Lockers; 510 Materials Handling Equipment; 511 Shelving; 512 Metal Lumber

**COMPLETE CONTAINERIZATION**... Republic Box and Skid Units provide for multi-purpose service for delivery of semi-finished parts to production, feeding parts to machines, receiving finished parts as they come off the machining line, and storage. Complete production and inventory control from raw materials to finished products. Materials handling engineers will help you with your planning.

**REPUBLIC WEDGE-LOCK® SHELVING** is designed to handle heavy-weight storage. Wedge-Lock construction includes the three prime essentials of good shelving: 1. a post that will not bend, 2. a reinforced shelf that does not sag, and 3. a concealed sway-proof joint. Republic's Berger Division offers a complete line of shelving, storage units, and shop equipment to meet your needs.

**REPUBLIC METAL LUMBER®** solves framing problems fast. Simply measure, cut, assemble with ordinary bolt and nut fasteners. METAL LUMBER is fabricated from cold rolled steel to assure uniform physical properties, and high strength-to-gage ratio. Bonderized after fabrication for complete protection of all exposed surfaces. Available in two gages, two widths, in standard bundles of either 10- or 12-foot lengths. Write for more information.

REPUBLIC STEEL

# REPUBLIC STEEL

*World's Widest Range*
*of Standard Steels and Steel Products*

**REPUBLIC STEEL CORPORATION**
**DEPT. FA-9080-R**
**1441 REPUBLIC BUILDING • CLEVELAND 1, OHIO**

Please send additional information on the following:

- ☐ Republic Steel Lockers
- ☐ Materials Handling Equipment
- ☐ Wedge-Lock Shelving ☐ METAL LUMBER

Name_____ Title_____

Firm_____

Address_____

City_____ Zone____ State_____

# HUMAN RELATIONS

By V. E. LUNARDI, Assistant Editor, FACTORY

## Employees lay cards on table

Want to know what your employees think of their labor contract? Thompson Ramo Wooldridge Inc. queried its Cleveland division hourly workers, following ratification of a new three-year contract. A company letter, with ballot—mailed to the home—invited comments on the contract. This was followed by in-plant voting. More than 5100 ballots were cast in the plant, or 1500 more than by mail.

Comments from those who voted "no" on ratification of the contract were of primary interest, but just as many "yes" voters offered opinions. Answers showed that some negative employees had misunderstood parts of the contract. These are to be clarified at a future employees-management meeting.

Particularly gratifying were the large number of replies expressing friendliness toward the company, its management and policies.

## Clerks on salary elevator

You'll have to raise your sights on the clerical budget for 1960-61, says the National Office Management Association, Willow Grove, Pa. Average weekly salary rate for clerks in the U. S. is now $73—$3 over 1959. The Association's recently completed clerical salary survey contains data on 23 jobs, 592,000 employees from 9100 companies in 136 cities throughout the U. S. and Canada.

The survey shows Canadian companies are more lenient than American in determining the basic work week and paid holidays. Canadians work a shorter week, with 77% of the companies reporting less than 40 hours. The 40-hour work week is still standard for most American companies reporting. And 90% of the Canadian companies surveyed grant more than seven holidays yearly, whereas a six-holiday limit is still most popular in the U. S. Office unions made slight inroads in the U. S. in 1959, while in Canada there has been a 3% drop from favor.

## Interviewer ferrets out facts

Accept at face value the opinions of former employers on job applicants and you may be sadly misled, says a recent issue of *Management Review*, New York City. But if you don't thoroughly investigate references, you stand a 50% chance of hiring the wrong man. How do you get around this roadblock?

It takes devious questioning and often a verbal ruse to get at the truth. Reference-givers tend to paint too damning or too bright a picture of the candidate. But only they—by revealing his past performance—can help you assess a man's capabilities. And only they can expose false claims or hidden faults.

This thumbnail course in super-sleuthing may strip the facts from reference-givers' fancies:

| *What he says* | *What he really means* |
|---|---|
| He's a consistently good team worker. | Hasn't had an original thought in 20 years. |
| He staunchly supports his superiors' ideas. | A yes man. |
| A strong speaker who sells his ideas. | Big Mouth. |
| Conscientious? Takes work home nights. | Unable to get organized. |
| Volunteers for most management committees. | Afraid to make his own decisions. |
| Excels at handling broad outlines of a project and delegating details. | Can't add. |
| Believes in face-to-face contact rather than memos and reports. | Can't spell. |
| Has good command of job, considering his age. | Too young to cut the mustard. |
| I believe he's thinking in terms of $25,000. | He'll jump at $17,000. |
| I'm sure he can handle your job. | We're glad to get rid of him. |

*Turn the page*

*"Looks like the Third Division is moving up..."*
*"...those are staff sergeant's stripes"*
*"The 15th Bombardment is here..."*
*"He just made Electronics Technician third..."*

In this way every man in the armed forces during World War II unmistakably identified his rank or specialty, his outfit — by the marking on his shoulder patch, on his "stripes", on the plane he flew. Literally hundreds of *new* marks had to be devised to identify the special groups and the greater numbers in service than ever before in history — yet millions of people nevertheless recognized these marks and instantly knew their meaning.

## marks of service

And this is exactly what *all* marking is for — the trademark and detail on a clothing label, a date code and value on an electronic component and the sales message on a plastic novelty all say what the product is or how to use it or who made it. At least this is the job that marking *should* be doing on *your* product or package . . . to speed its handling, help in its sale or end use, and encourage reordering.

Our business is developing the machines, printing elements and specialty inks to help *you* identify your product more effectively — and at the same time save you money. The best answers for one industry are often totally different from those for another industry, so we have available a sizable variety in equipment, marking methods and inks. The easiest way to find out which combination best suits your needs is to tell us what information you want to put on your product — and what the product is. Our answer may mean smoother production in your plant — and money in your pocket. Markem Machine Co., Keene 18, N. H.

*Everything industry needs* **MARKEM**
*...for profitable marking*
*...since 1911*

*Top to bottom: 79th Inf. Division, Electronics Technician 3 (Navy), 9th Bombardment Group, Staff Sergeant's chevrons, Third Inf. Division, 15th Bombardment Group, Navy Squadron VF-6.*

# SEE IT WHEN IT

# HAPPENS!

**PHILCO CLOSED CIRCUIT TV**
**has many applications that will speed production, control operations, improve communications, increase security *in your plant!***

Industry is rapidly adopting closed circuit TV to speed operations and reduce costs by enabling management and operating personnel to "see it when it happens"! Philco's broad experience in CCTV will help you to make the most efficient use of this modern and flexible business tool. Philco has pioneered in fully-transistorized equipment that provides maximum reliability and freedom from maintenance. It is as easy to operate as your home TV. Write today for your free copy of the Philco Closed Circuit TV System Planning Guide.

**PHILCO ALL-TRANSISTOR SELF-CONTAINED CCTV CAMERA**
*For the finest in closed circuit TV*

**GOVERNMENT & INDUSTRIAL GROUP**
4700 Wissahickon Ave., Philadelphia 44, Pa.
In Canada: Philco Corp. of Canada, Ltd., Don Mills, Ontario

PHILCO®
*Famous for Quality the World Over*



*Begins on page 218*

## Coffee on the house

"The treat's on me" said Dow Chemical Company to 12,000 Midland (Mich.) division employees invited to a mass coffee break. The occasion marked the completion of 5-million consecutive man-hours without disabling injuries. Coffee, doughnuts, and the trimmings were served to employees at work stations. At the same time, 200 workers from all units contributing to the record participated in the president's safety award ceremonies. These festivities will be repeated each time this record (or 5 years without disabling injuries) is met.

## VIPs—alone on peaks of success

What are you willing to sacrifice in your climb to the top of the executive ladder? Status symbols such as high pay, a fancy office, and private clubs that mark you a VIP come at a price you may not be willing to pay. Prof. George S. Odiorne of the Bureau of Industrial Relations, University of Michigan, Ann Arbor, offers this list of penalties:

1. Sacrifice of leisure time. Greater responsibilities leave less time for pleasure.
2. Sacrifice of the life of the mind. Less time to read other than business literature.
3. No cultural or aesthetic pursuits. Too occupied and unrelaxed to enjoy such diversions.
4. Sacrifice of normal family life. Travel demands prevent ball-playing with kids or helping with their homework.
5. A rootless existence. Moving around means unstable home-town life. No opportunity to build up personal and family relationships.

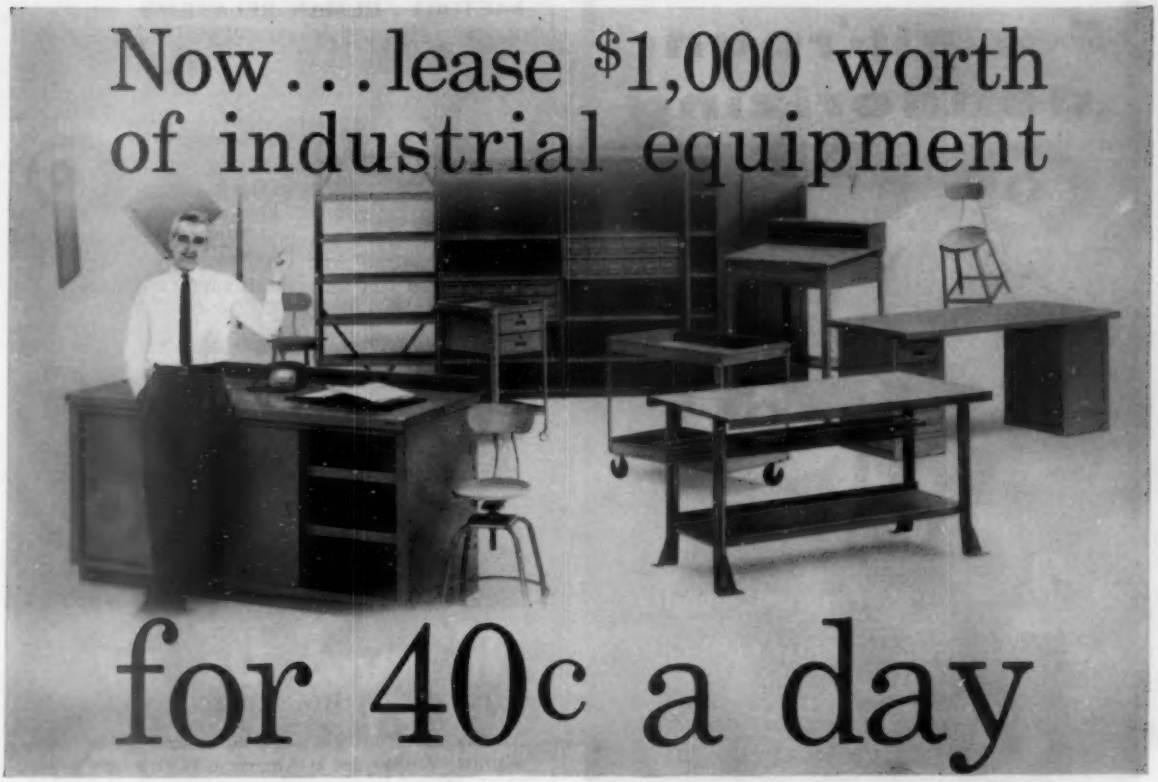
Changed your mind about entering the rat race?

## Want ads: business barometers

Low and high tides in the business cycle are closely related to classified help-wanted advertising, according to an index released by the National Industrial Conference Board, New York City.

The index is based on help-wanted ads of leading newspapers in each of 33 cities representing major

# Now...lease $1,000 worth of industrial equipment



# for 40c a day

Any way you figure—$1000 to $10,000 or more worth of shop equipment—you'll be dollars ahead with the new Columbia-Hallowell Lease Plan. In addition to enjoying low leasing costs, you benefit by a most flexible time schedule. From three to ten years . . . with option to renew or purchase at low cost. And remember—whether you lease or buy, it's good business to specify Hallowell Shop Equipment. It is rugged, functional, versatile . . . *custom* in everything but price.

**CHOOSE FROM A WIDE SELECTION OF HALLOWELL SHOP EQUIPMENT**

■ Open Benches ■ Cabinet Benches ■ Unit Benches ■ Shop Desks ■ Stools & Chairs ■ Tool Stands ■ Industrial Cabinets ■ Storage Walls ■ Erectomatic® Shelving ■ Steel Shelving

**OFFICE FURNITURE, TOO.** You can lease famous Columbia Office Furniture—modular work centers, desks, chairs, files and office partitions under this same adaptable plan.

## COLUMBIA-HALLOWELL LEASE PLAN

Mail coupon for free booklet giving full details of the Columbia-Hallowell Lease Plan

**COLUMBIA-HALLOWELL DIVISION**
**JENKINTOWN 11, PA. • SANTA ANA, CALIFORNIA**

SPS

*where reliability replaces probability*

COLUMBIA-HALLOWELL DIVISION SPS
Jenkintown 11, Pa.

Please send me full information on the Columbia-Hallowell Lease Plan.

Name_____
(Please Print)

Company_____

Address_____

City_____ Zone____ State____

For all-'round deodorizing

Fragrant, laborless deodorant discs for urinals, bowls, garbage pails, lockers, closets

**Deodoroma ROUNDS** cost in use averages only a *fraction* of one cent a day. Rounds are formed under 70,000 pounds pressure: are dense and durable. Fragrance is locked in: lasts until the last particle has vaporized — there's no harsh "moth cake odor." Packed eight to the telescoping box — each Round sealed airtight — easy-to-shape Holzit wire holder in every box. For literature write to The C. B. Dolge Company, Westport, Conn.

For free sanitary survey of your premises ask your Dolge service man

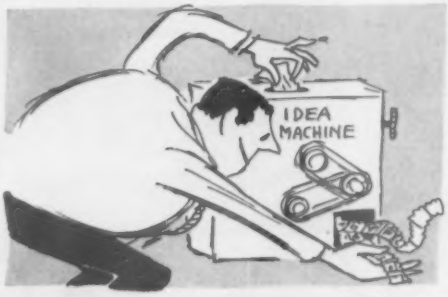
Dependable DOLGE WESTPORT, CONNECTICUT



*Begins on page 218*

labor market areas. It shows, in terms of current behavior, the decline of help-wanted ads during the steel strike, the subsequent rise in the two months following the strike, then the fall to pre-strike level.

Monthly or even weekly trends can be assessed with this up-to-the-minute information from the classified pages. And since most towns have local papers, you can index both small and large areas.




## Idea mill runs on green stamps

Money has lost its sex appeal in this era of trading stamps. Employees at American Hardware Corporation's Kwikset plant, Anaheim, Calif., would rather have green stamps than greenbacks. Proof of the pudding: Output of ideas has doubled since the company first offered trading stamps as rewards for employee suggestions.

For each idea submitted, an employee receives 30 trading stamps redeemable at local stores. If the idea is adopted, the employee gets a cash award plus additional stamps equal to the full amount of the prize. Each dollar is worth an extra 100 stamps.

Contrary to most programs, this one rewards all ideas, not just those adopted. But there has been no deterioration in quality of ideas.

To what does the company attribute the success of its stamp plan? The wives, of course, who know the magic a book of green stamps can conjure up.

## If the shoe fits, wear it

A crushed shoe hangs on the lower part of a pegboard at the Bridgeport (Conn.) division of Raybestos-Manhattan, Inc. "Would you have been saved?" asks the caption. One of the employees was —when a steel skid dropped on his foot. The metal tip of his safety shoe saved him from serious injury and probable amputation of his toes.

The lucky man, holding the shoe, drives the message home in a photo on the board. Nobody in the shop can miss this itinerant picture-frame display. It is moved from department to department, silently selling the value of safety shoes. Periodically, the display changes to illustrate other safety equipment.

NEW

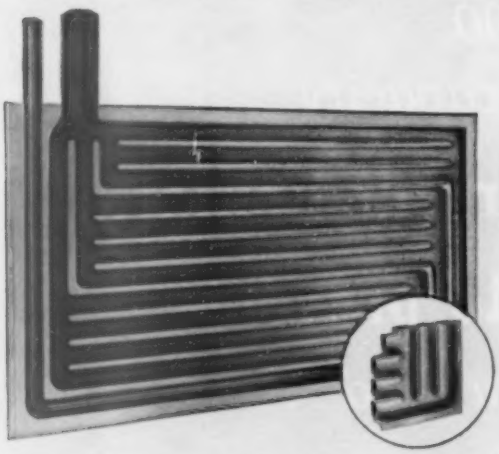
MULTI-ZONE

# PLATECOIL®

# OPERATING PRESSURES UP TO 250 PSI

Now you can apply the performance and cost advantages of PLATECOIL to tank and process heating with steam pressures up to 250 psi. Higher pressure containment is the result of design and construction refinements such as DURAWELD bonding of plates, new patented MULTI-ZONE pass arrangement and TRANSTEEL mild steel in standard PLATECOIL units. Laboratory tests to destruction have demonstrated a safety factor of 5 to 1.

## PLATECOIL SOLVES ALL KINDS OF TANK AND PROCESS HEAT TRANSFER PROBLEMS



PLATECOIL is applicable to a broad range of heating and cooling applications. MULTI-ZONE, header type PLATECOIL, through better distribution of steam, has a reserve of heat transfer capacity for faster "heat-up" and less down time. This reserve capacity also produces extremely fast recovery of desired operating temperatures to keep processing efficiency up. Standard MULTI-ZONE and serpentine (for cooling) units are available in a wide range of sizes.

PLATECOIL units are available in mild steel, stainless steel, Monel, Ni-o-nel, Hastelloy B, Hastelloy C, Nickel and many other metals. All stainless steel and alloy PLATECOIL units affected by cold working are annealed and pickled after fabrication to return the metal to its original condition and thus eliminate the probability of corrosion due to internal stresses and carbide precipitation.

Variations such as double embossed, single embossed (one side flat), banked units and units rolled to specified diameters add to PLATECOIL application possibilities. Surface finishes to meet all types of operating requirements, use of PLATECOIL as structural parts such as tank walls, special connections, hangers and other accessories make PLATECOIL applicable to many special heat transfer problems.

Simplify engineering, installation and maintenance with PLATECOIL — the modern answer to tank heating and cooling problems.

*Send for Bulletin P60 for complete information.*

**Tranter Manufacturing, Inc.**

**LANSING 9, MICHIGAN**

**PLATECOIL® DIVISION**



**For more facts Circle 517 on Reader Service Card**

*For fuses with 200,000 ampere interrupting capacity...*

**_plus_, extreme current-limitation**

**_plus_, time-lag to prevent needless blows – *you need* . . .**

# Buss LOW-PEAK fuses

# A Revolutionary New Protective Device

**Buss LOW-PEAK Fuses** are designed to meet modern demands for electrical protection.

They safely interrupt fault currents up to 200,000 amperes . . . limit let-thru current to exceptionally low values . . . and hold 500% load for minimum of ten seconds.

Protect Mains, Feeders, Branch Circuits, Motors, Controllers, Switches—no matter whether the fault current is 1,000 amperes, 25,000, 100,000—or as high as 200,000 amperes.

Reduce stresses and prevent damage to Panelboards, Switches, Motor Controllers—other circuit components—because let-thru fault currents are limited to exceptionally low values.

Can be easily co-ordinated into a selective system—to limit fault outages to circuit of origin.

Prevent work stoppages, lights out, waste of time and money—because long time-lag keeps them from opening needlessly on motor starting currents or other harmless overloads.

Permit increasing interrupting capacity and current limitation on present electrical system at minimum cost. Buss LOW-PEAK Fuses fit standard switches and panelboards. Available from 15 to 600 amperes in both 250 and 600 volt ranges.

Guard motors against burnout from single phasing and overloads.

Low operating temperature reduces heating in switches and panels.

Provide thermal protection for equipment against damage due to poor contact.

Protect against waste of space and money by permitting the use of proper size switches and panels.

Remain safe throughout the years without maintenance or recalibration.

▼

***Write for Buss LOW-PEAK Bulletin Now . . . or use coupon.***

**BUSSMANN MFG. DIVISION,**
**McGraw-Edison Co.**
**St. Louis 7, Mo.**

▲

**Bussmann Mfg. Division,** McGraw-Edison Co.
University at Jefferson, St. Louis 7, Mo.
Please send Buss LOW-PEAK Fuse Bulletin LPCS.

Name.....

Title .....

Company.....

Address.....City.....State.....

F-960



For more facts Circle 518 on Reader Service Card

For more about these items, circle numbers on Reader Service Card next to back cover.

## Water-sprayable plastic

A sprayable coating of Penton chlorinated polyether in water suspension, called Pfaudlon 301, can be applied to surfaces in desired thicknesses (20 to 40 mils) with only two coats. Four or more thicknesses are commonly required when other coating methods are used.

Economical and non-hazardous, the material offers these additional advantages: (1) parts do not require preheating as in other dry-coating techniques; (2) complex shapes can be quickly covered, and surfaces that don't require the coating can be easily excluded; (3) a superior bond is obtained between the metal surface and the resin.

Although the method of application is similar to that used with organic suspensions, the maker believes the water-spraying technique is superior. Reason: It requires no elaborate safety devices to guard against toxicity and flammability. To apply, clean the surface, spray on the resin, drive off water, and fuse coating to metal. *Pfaudler Co.* (Circle 195)

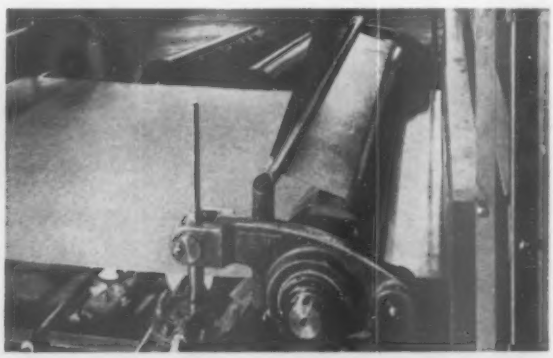
**196—Teflon Tape** for dry sealing all types of threaded pipe joints and cable connectors eliminates the need for pastes and compounds. It can be used on iron, steel, brass, aluminum, and synthetic rubber. Tape withstands temperatures to 500 F. *Hitemp Wires Inc.*

**197—Non - Flammable Enamel Paint** is based on a non-volatile chlorinated alkyd resin solution. It has passed the Navy test under which paint films on a steel panel won't ignite after a 30-sec. electrical heating that reaches a temperature of 2300 F. *Hooker Chemical Corp.*

**198—Aluminum Flake Coating** for roofs can lower building temperatures from 15 to 25 F., according to the producer. The highly reflective coating, which is applied over surfaces by brush, protects from both weather and sun. *Consolidated Paint & Varnish Corp.*

## Glass spray fights corrosion

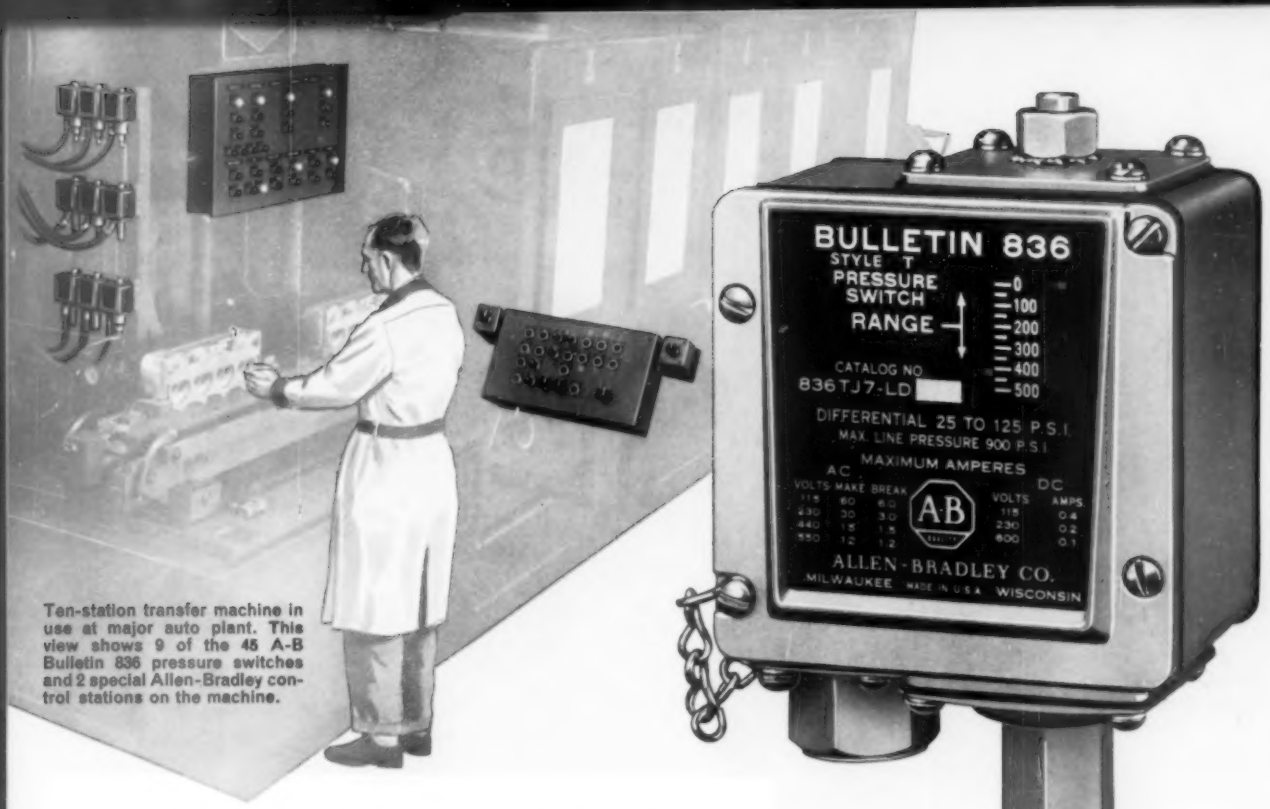
Protective Fiberglas Flake, a spray coating providing a corrosion-resistant surface to metals, wood, and concrete, is a homogeneous mixture of the Flake, plus resin, fillers, accelerator, and pigment (if desired). Ready to use, the material is simply sprayed on, then rolled to achieve a smooth uniform surface. *Owens-Corning Fiberglas Corp.* (Circle 199).



## Laminate resists separation

This vinyl-metal laminate, called Clad-Rex 102, can be worked with conventional metal-forming equipment, permitting exposure to extreme temperatures without delamination. It can be punched, trimmed, or drawn as deep as 9:1 ratio without the vinyl pulling away from the metal. Available in most decorative vinyl designs. *Simoniz Co.* (Circle 200).

*Turn the page*




Ten-station transfer machine in use at major auto plant. This view shows 9 of the 45 A-B Bulletin 836 pressure switches and 2 special Allen-Bradley control stations on the machine.

# ALLEN-BRADLEY

## OILTIGHT

# Pressure Switches

*provide consistent accuracy and maximum reliability*

Bulletin 836 Style T
Oiltight Pressure Switch

These rugged Allen-Bradley Bulletin 836 Style T oiltight pressure switches are specifically designed to take the punishment of hard, day-in and day-out industrial use. The die-cast aluminum housing is completely sealed. Oil cannot get in and foul the contacts—even when it flows over the enclosure in a continuous stream. The precision switch mechanism insures extreme accuracy of repeatability. An extremely important feature lies in the "snap action" of this switch—it maintains its normal contact pressure up to the instant of switchover—regardless of how slowly the trip point is approached. Contact chatter—which means unreliable operation—is impossible, and contact life is greatly increased. The contact block has two isolated circuits with one N.O. and one N.C. set of contacts.

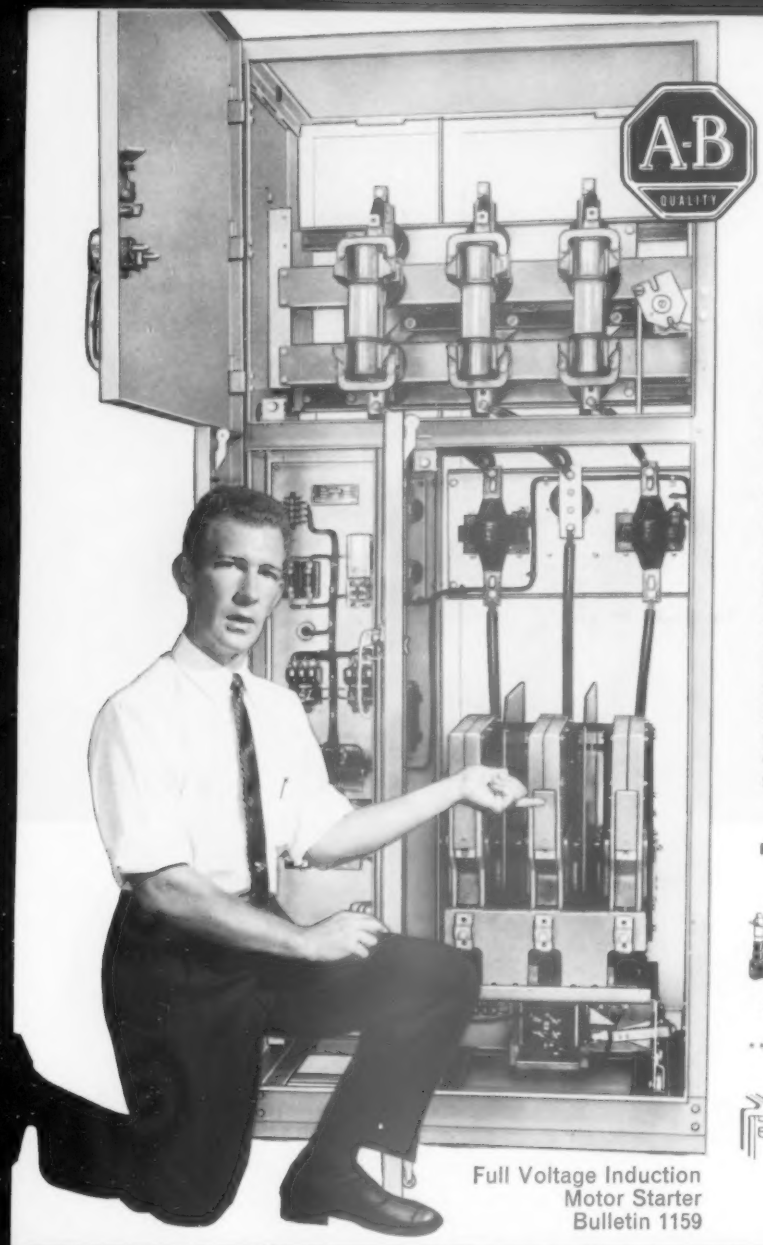
Both the operating pressure and the differential are adjustable. The pressure is externally adjustable with the setting shown on a calibrated scale, and a trip indicator shows the operating point. These A-B *quality* controls are made for operating at pressures up to 5000 psi. Write for full details.

# ALLEN-BRADLEY

Member of NEMA

**QUALITY MOTOR CONTROL**

Allen-Bradley Co., 1319 S. Second St., Milwaukee 4, Wis. • In Canada: Allen-Bradley Canada Ltd., Galt, Ontario




Full Voltage Induction
Motor Starter
Bulletin 1159

# *The only* HIGH VOLTAGE STARTERS

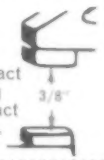
## *built to provide millions of trouble free operations*

An astounding claim but true! The secret of this remarkable operating life of Allen-Bradley high voltage air break starters is found in the extremely short contact travel—*it's only 3/8"*. Thus, pounding and contact wear are reduced to a minimum. In addition, contactors in A-B high voltage starters have only ONE moving part. It's the same simple solenoid design that has proved good for millions of trouble free operations in A-B low voltage starters. And like A-B low voltage starters, the double break, silver alloy contacts never need maintenance. For complete details on Allen-Bradley high voltage starters, send for Publication 6080.

**FEATURES OF THE ALLEN-BRADLEY RUGGED SOLENOID AIR BREAK CONTACTOR**

**ONE MOVING PART**
All trouble-causing pivots, pins, and flexible jumpers are eliminated.

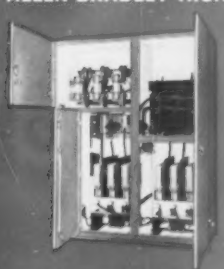
**CONTACT TRAVEL ONLY 3/8"**
Reduced impact and pounding extends contact operating life.



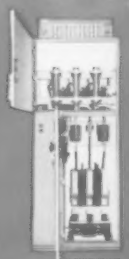
**DOUBLE BREAK CONTACTS**
of silver alloy completely eliminate the need for contact maintenance.

**FAST ARC SUPPRESSION**
New blowout design, new arc chutes molded of arc resistant material.

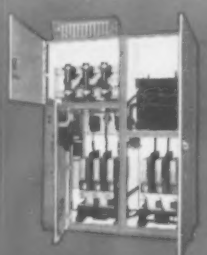
**ALLEN-BRADLEY HIGH VOLTAGE STARTERS ARE MADE FOR ALL TYPES OF MOTORS AND ALL TYPES OF SERVICE**



Reduced Voltage
Induction Motor Starter
Bulletin 1172



Full Voltage
Synchronous Motor Starter
Bulletin 966



Reduced Voltage
Synchronous Motor Starter
Bulletin 983

Wound Rotor Motor Starter
Bulletin 1180

# ALLEN-BRADLEY

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Allen-Bradley Co., 1316 S. Second St., Milwaukee 4, Wis. • In Canada: Allen-Bradley Canada Ltd., Galt, Ontario

***QUALITY MOTOR CONTROL***

12-60-MP

## FACTORY / MATERIALS NEWS

*Begins on page 226*

For more about these items, circle item numbers on Reader Service Card next to back cover.

**201—Water Dilutable Paint Stripper** is used at room temperature and is non-flammable. It's effective on epoxy and other synthetic enamels as well as plastisols. Material breaks the bond instead of dissolving the paint; therefore, it lasts longer. *The Esbec Corp.*

**202—Exterior Masonry Finish,** called Adfinish, comes smooth or textured, can be applied either by brush or spray to dry, damp, or painted surfaces. No surface preparation is required and the product is self-curing. Once applied, finishing is complete. *Swift & Co.*

**203—Cobalt-Base Alloy** has good castability and foundry characteristics, was designed especially for investment casting. Tests showed an 18% increase in 1800 F. stress rupture life and a 160% increase in rupture elongation over other alloy variations. *WaiMet Alloys Co.*

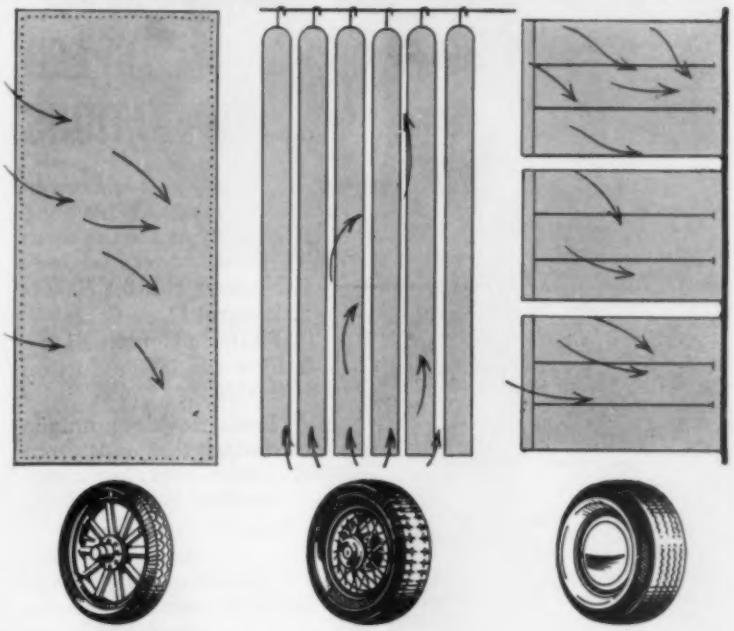
**204—Vinyl Heat-Reactive Tubing** shrinks under heat to provide a tight covering for either symmetrical or gently contoured shapes. Now available fully transparent or in unimprinted black. For use on objects 3/64- to 5-in. outside dimension. *Minnesota Mining & Mfg. Co.*

**205—Instrument Tubing Harness** has polyethylene core tubes said to permit operation at higher temperatures than previously possible with all-plastic harnesses. Core tubes are tightly wrapped with Mylar tape, then covered with an extruded vinyl sheath. *Samuel Moore & Co.*

*Turn the page*


SINCE 1870 SLY

**SLY DUST FILTERS For LONG BAG LIFE**



1900's
**SLY DUST ARRESTER**

Cloth screens on wood frames were rigidly fastened to the dust arrester case, causing strain and excessive wear.

1930's
**SLY TUBE-TYPE FILTER**

Certain areas of cloth tubes, particularly around the cuffs, bore the brunt of incoming dust-laden air, leading to premature failure. Shaking device also contributed to wear.

**TODAY NEW SLY "ROLL-CLEAN" DYNACLONE®**

"Resist-O-Wear" filter bags have 3-section design for greater strength. Spacer weight is distributed on 3 seams. Bags are cleaned by reverse air.

**New Dynaclone Filter Bags Provide 2 to 3 Times Longer Life**

*New Sly "Resist-O-Wear" bags* (patent pending) far outlast other types, as proved on the most demanding applications. In addition to basic bag strength, Dynaclone construction and low-velocity design insures even distribution of dust-laden air over the entire cloth area . . . there is no dust concentration at certain points. Dust is removed automatically by reverse cleaning air — no shaking, no abrasion.

*The Dynaclone operates continuously,* 24 hours a day if required. Uniform, constant suction at dust sources results in complete dust collection.

*Sly Dust Filters provide 20 to 40% more cloth* in a given space than any other type. Space saved means lower installation costs, simplified piping and ductwork.

There are more than 40,000 Sly Dust Filters in use, including over 1,000 Dynaclones. Investigate their advantages on your applications . . .

*SEND FOR 36-PAGE CATALOG 104*

**THE W. W. SLY MANUFACTURING CO.**

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# 3 POWELL EXCLUSIVES REDUCE PRODUCTION HANDLING COSTS, SAVE SPACE, SPEED OPERATIONS

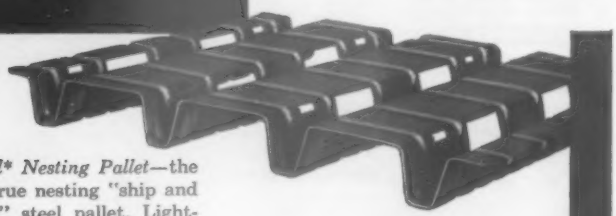
*Flow-Matic* Production Systems* can reduce work station handling by 50%. Fastest, most efficient handling method available. *Write for Bulletin FM.*

Typical of Powell's leadership in modern materials handling equipment are the three exclusive designs—

1. Nesteel* Nesting Pallets
2. Integral Knee-Brace* Platform Construction
3. Flow-Matic* Production Systems

Each provides a unique advantage that adds up to better, faster, safer, less costly handling for your plant.

Powell's line ranges from standard pallets and platforms to complete materials handling systems . . . all described in *free bulletin 900.* Write for it today.



*Nesteel* Nesting Pallet*—the only true nesting "ship and return" steel pallet. Lightweight—strong—may have four-way entry—ideal for confined or angle storage areas. *Write for Bulletin X100.*

*Integral Knee-Brace** construction eliminates conventional platform weakness—adds years of service at no extra cost. *Write for Bulletin 2449.*

POWELL PRESSED STEEL

**THE POWELL PRESSED STEEL COMPANY**
50 ERIE STREET • HUBBARD, OHIO
*The most complete line of material handling equipment.*


## FACTORY / MATERIALS NEWS

*Begins on page 226*

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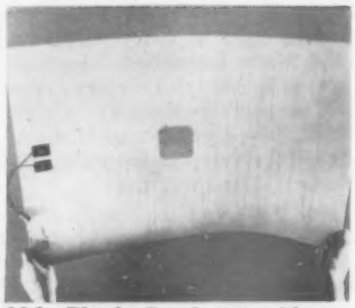


**206—Plastic Laminates** with embedded electric heating elements can be designed for watt densities with surface temperatures in the 400-500 F. range. Sheets come in several types of plastics and in sizes to 36x48 in., thicknesses to 0.020 in. *Bischoff Chemical Corp.*

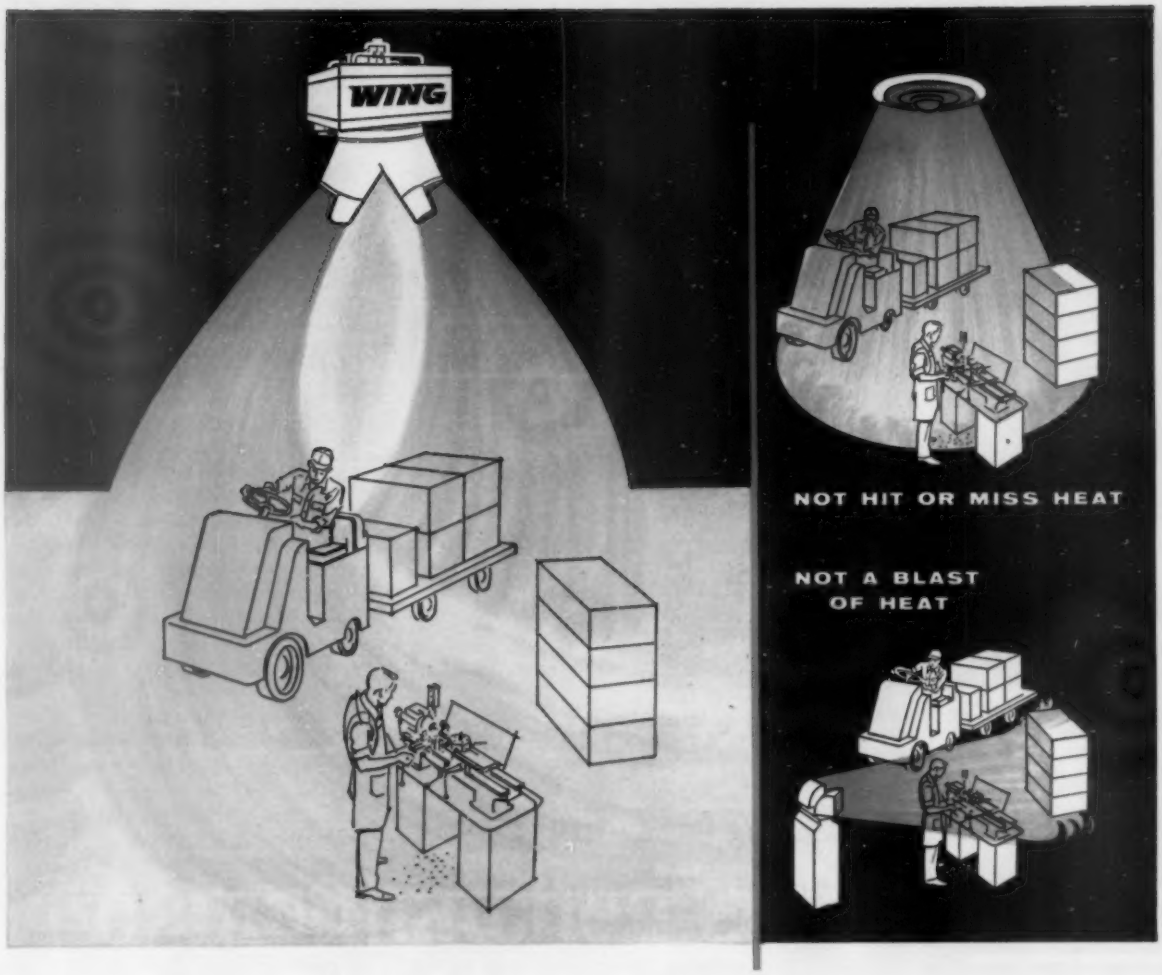
**207—Stainless-Clad Steel Tubing,** in diameters to 3½ in. and with composite wall thicknesses to ¼ in., is for applications where the surface qualities of stainless tubing are desired at a lower cost. Bond to carbon steel is produced by drawing. *The Standard Tube Co.*

**208—Heat-Insulated Copper Tubing** has a polyvinyl chloride jacket with an inner profile of star-shaped serrations. Tips of the serrations rest on the tubing, leaving longitudinal air channels that act as insulation. It's called ThermoTube. *Columbia Technical Corp.*

**209—Detector Tape** instantly warns of gas and liquid leakage of as little as 1/100 cc. per hour. Tec-Tape is flexible, adhesive-backed, and has an indicator that turns a contrasting color when exposed. Can be used to detect a variety of materials. *Pyrodyne, Inc.*

**210—Rubber-Cushioned Ceramic Mosaics** are made of a 9-in.-square preformed rubber grid that holds 64 ceramic tiles. Maker says this is an economical ceramic floor that is both quiet and easy on the feet. The tiles are available in 12 color combinations. *United States Ceramic Tile Co.*

*Turn the page*




# Only Wing Revolving Heaters Provide a Sweeping Flow of Perfect Heat

The unique slowly revolving discharge of Wing Heaters blankets the heating area—and does it more economically—than other heating units. With Wing Heaters, you can be sure that warm air is spread over the entire working area—throughout the occupancy zone, behind and around obstructions and into corners. There are no cold areas or torrid blasts as with other heater designs. Result? Workers are more comfortable and more productive.

Wing Revolving Units provide greater coverage—fewer units are needed—so, installation savings result. Standard units can be mounted from 8 to 65 feet. Higher mountings can be met if desired.

Wing Revolving Heaters have proved their outstanding performance in thousands of installations over many years of service life. They are easy to install, simple to maintain—and are available for steam, hot water or gas. Four types of revolving discharges are available to suit your requirements.

Write today for complete information telling how Wing Revolving Heaters can give you lowered costs and reliable operation.

**L. J. WING MFG. CO.**
DIVISION OF AERO SUPPLY MFG. CO. INC.
162 VREELAND MILLS ROAD, LINDEN, NEW JERSEY
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**WING**

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Find out now how you can make important savings in your new and maintenance paint jobs. Here are just a few of the many helpful hints covered in this new, 12-page Barreled Sunlight guide to economical painting practices:

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## FACTORY / MATERIALS NEWS

*Begins on page 226*

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## MATERIALS LITERATURE

**211—Urethane Coatings** are described in a 4-page information file that includes a chart of physical, chemical, and mechanical properties. Lists suggested uses for many new products as well as for plant maintenance. *B. B. Chemical Co.*

**212—Nickel-Chromium Alloy** for use as heating elements in controlled atmosphere furnaces gets detailed treatment in Bulletin 110, an 8-pager. There are typical life and temperature-resistance curves, other test data. *Hoskins Mfg. Co.*

**213—Foundry Binders** and additives are covered in this 12-pager. Illustrated text discusses sand properties imparted by the binders, gives applications. Also lists additives for promoting peel in $CO_2$ sand mixes. *Corn Products Sales Co.*

**214—High-Tensile Steel,** Yoloy E, has its special features listed in a 4-page brochure that includes details of composition, mechanical properties, and a chart showing fabrication practice for cold forming. *Youngstown Sheet & Tube Co.*

**215—Heat Resistant Coatings** of silicone and silicone-ceramic are offered in Bulletin 1570 (20 pages). Tells how the coatings give protection, discusses application methods, weathering and corrosion characteristics. *The Dampney Co.*

**216—Shaped Wire** available in a variety of cross-section forms is covered in this 16-page catalog. Also lists physical properties of steel wire, standard wire gauges, and hardness conversion data. *American Chain & Cable Co.*

**217—Fluids and Lubricants** of Ucon polyalkylene glycol are discussed in this 52-page booklet. Has extensive technical data, including selection chart, handling methods. *Union Carbide Chemical Co.*



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For more facts Circle 524 on Reader Service Card ➤

ONE pump becomes MANY . . . saving you pump dollars . . . giving you a wide range of clear water, non-clog and other liquid-handling modifications . . . when you standardize your pumping operations with Fairbanks, Morse ADAPT-*ABLE* pumps.

*F-M* ADAPT-*ABLES* consist of a pump frame and simple adapter to which can be attached a wide variety of F-M hydraulic ends with enclosed, semi-open or non-clog impellers. Conversion is easy . . . inexpensive, too.

*F-M* ADAPT-*ABLES* are *"NEMA-Matched"*: pump mounting dimensions are standardized with similar dimensions of Nema-driving motors. Gone is the need for make-shift height-adjusting blocks and odd-bore couplings!

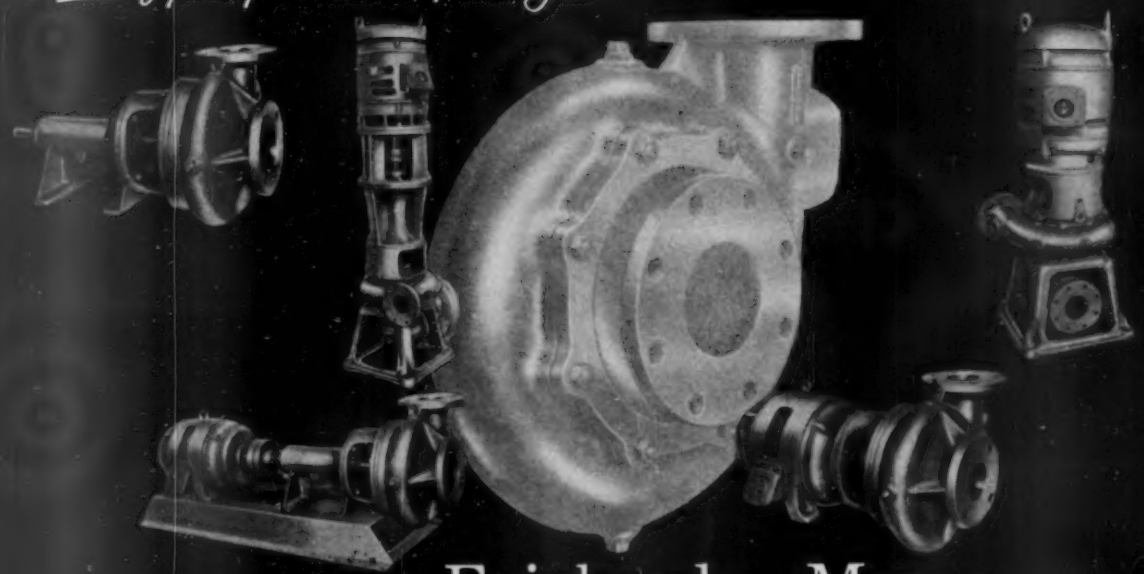
The ADAPT-*ABLE* design means that the most economical frame size may be selected to match the motor horsepower requirements of the pumping job.

And there are other advantages: choice of mechanical seals or conventional stuffing boxes with easy field change-over from one to the other . . . interchangeable bearings for pumps and motors. For special liquid handling problems, hydraulic ends can be specially alloyed to fit the needs: we've been solving such problems for generations.

Regardless of *what* liquids you pump . . . or *where* . . . Fairbanks, Morse builds pumps and *matching* power units for *your* use . . . in a greater range of sizes, types and capacities than *anyone, anywhere*. Start SAVING pump and motor dollars by putting F-M's vast hydraulic experience to work in your plants, process lines and products . . . now!

# "nema-matched" adapt-ables

*. . . a lot of pumps in ONE package!*



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THE PROUDEST NAME IN PUMPS

Pump and Hydraulic Division • Kansas City, Kansas

A MAJOR INDUSTRIAL COMPONENT OF FAIRBANKS WHITNEY CORPORATION

# Where PRODUCT PURITY is important, protection gets a hand from Alcoa

When protection against contamination from *any* source is vital, take a look at what Alcoa aluminum electrical rigid conduit offers. ¶ It needs *no* protective coating, because it forms its own—an oxide film that repairs itself when damaged. ¶ It's corrosion-resistant—stands up particularly well against acids commonly present in food plants: citric, acetic, tannic. And the compounds that might form when aluminum is used are in most cases *nontoxic*, completely safe. ¶ What else? Aluminum is lightweight (weighs about 1/3 as much as steel), so it's easier to install. Alcoa conduit is also nonmagnetic, nonsparking, and neat appearing. ¶ Consider all costs—initial, installation, maintenance—plus long service and you'll see why Alcoa aluminum conduit is a sound investment. ¶ For full details, contact one of our nearby representatives. Or write to Rome Cable Division of Alcoa, Dept. 21-90, Rome, New York.

◀ ADDED PROTECTION against product contamination is provided by Alcoa aluminum conduit. It needs no protective coating, resists corrosion, and is nontoxic.

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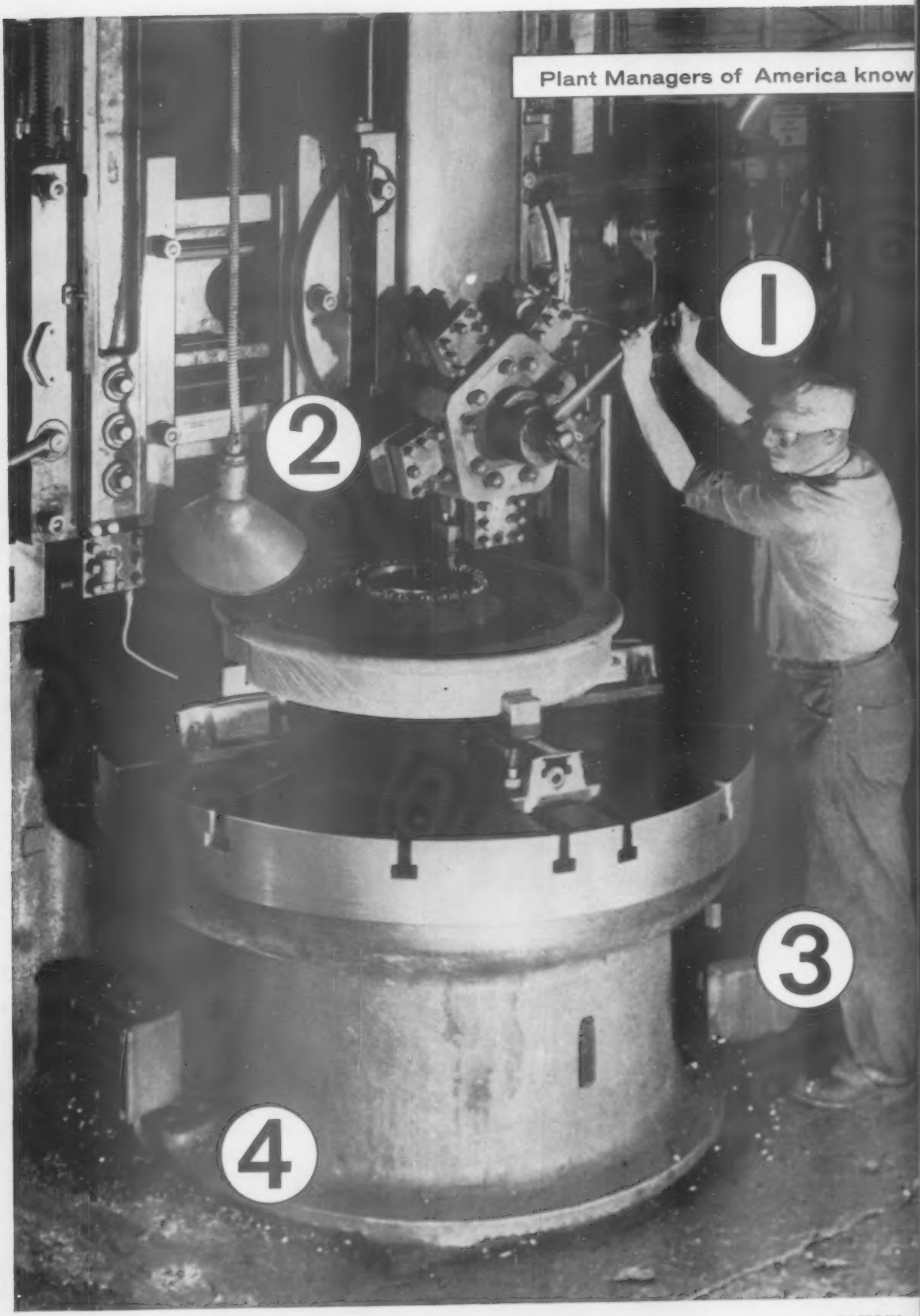
Plant Managers of America know
1
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American Mutual aims at Better Protection . . . Lower Cost

# Just a routine boring mill operation, but what happens to production if . . .

1. Man was not wearing safety goggles . . . flying chips struck eyes.
2. Poor lighting caused eye fatigue . . . leading to accident.
3. Man was not wearing safety-toed shoes . . . heavy object falls on foot.
4. Work area became cluttered . . . man stumbled and injured himself.

Let's face it: When workers do a job enough times, they tend to take safety for granted. That's where accidents creep in. They may relax their vigilance . . . just enough to let accident-influencing conditions develop. Next thing is . . . an accident . . . which results in injury, damaged material or equipment.

To keep accidents down and production stoppages to a minimum, many companies have turned to American Mutual. AM Safety Engineers offer advice and counseling that can help you improve your safety record. But equally important, they have the production man's interests in mind: the protection of men, material and machinery so that production flows without interruption.

Many AM policyholders who have put the AM man's suggestions into operation not only benefited from improved production, but as a result gained in lower insurance costs . . . which in turn may be reflected in lower product costs and higher profit potential.

Typical case history: Sonoco Products Co. of Hartsville, South Carolina has been an AM policyholder for 29 years. In the past 11 years alone they have saved $84,161 in dividends and $444,669 in lower insurance rates (difference between manual rates for their industry and premiums actually paid). Why not see what American Mutual can do for you? American Mutual Liability Company, Dept. F-3, Wakefield, Massachusetts.

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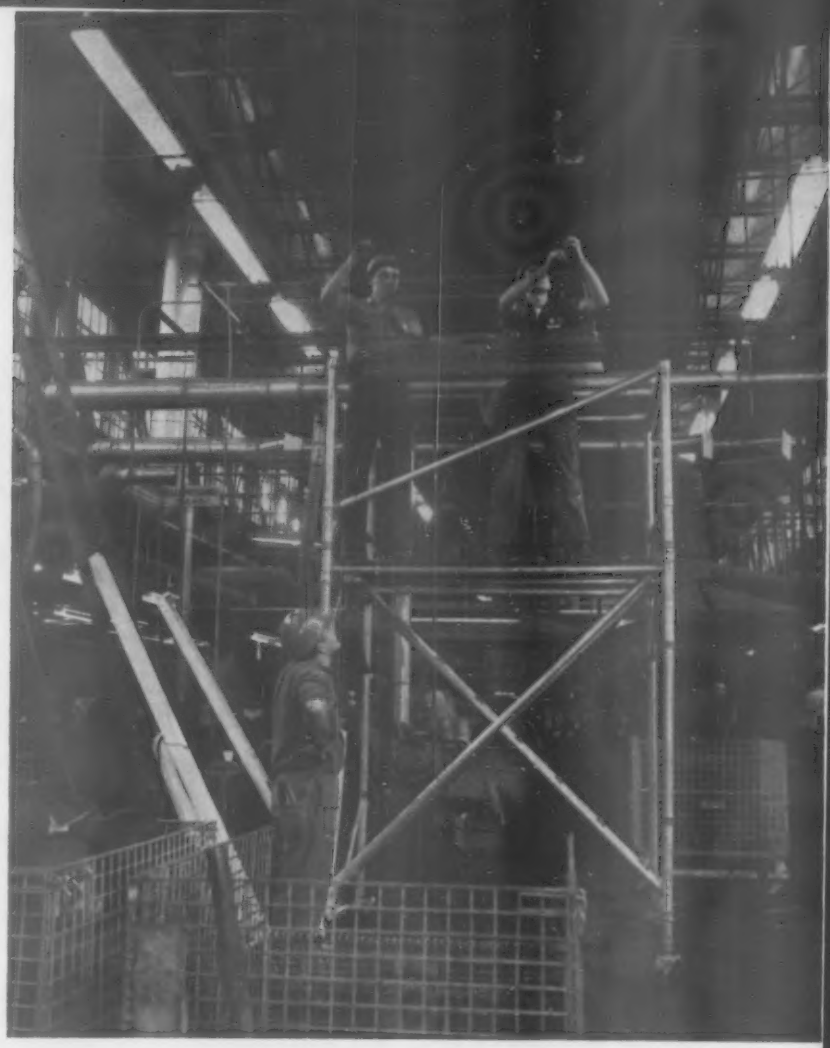
"The First American Liability Insurance Company" . . . a leading writer of Workmen's Compensation, all forms of Liability, Crime, Automobile, Group Accident and Health Insurance.

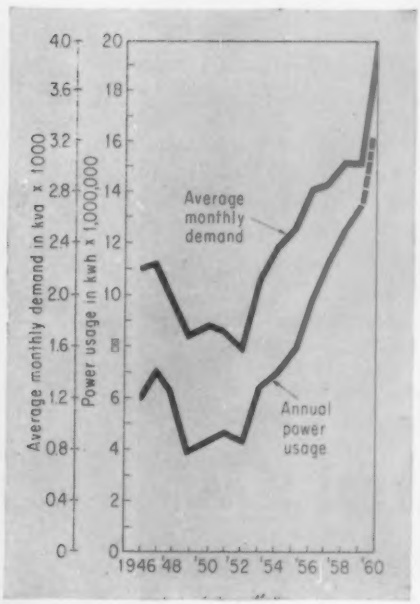
American Mutual

LIABILITY INSURANCE COMPANY

Director of plant engineering and facilities, Bob Neff (above, left) discusses the electrical modernization program with Ed Vihstadt, plant engineer for the Messler Street plant that can be seen through the office window. As a result of co-ordinated planning, electricians (right) remove obsolescent fixtures following installation of high-output fluorescent lamps that boosted light level 300%. As they worked, production continued with a minimum of interference.

First step of the entire program was an electrical survey. Below, a Cunningham-Limp (Detroit) engineer takes typical load measurements on a transformer in the basement of one of the buildings. Much of the equipment was found to be overloaded. Chart shows that the root of Brunswick's need for modernization lay in the growth of its load and power usage.





**Old plant power now matches . . . new plant across the street**

**Brunswick had a familiar problem: Age, expansion, and changing production had outmoded its power system. Here's how sound planning and a set of realistic goals insured installation of a superior system without slowing production.**

# Power system rallies tired plant

Though low-slung, the new plant (right) cast a long shadow over its sister across the road. It helped Brunswick Corporation managers see the old plant's inadequacies.

Most serious weakness of the old Muskegon, Mich., plant proved to be its power system. So management launched a long-range electrical rehabilitation program—a $180,000 project designed to turn a growing liability into an asset.

In vivid contrast to the new plant's award-winning beauty—it was a Top Ten winner in 1960 (FACTORY, May 1960, p. 86)—Brunswick's older plant is a complex of multistory structures of brick, masonry, and timber construction. The original buildings were erected over 50 years ago. Until recently modernized, most of the original power system was still in service. Although other plant utilities were badly in need of modernization, electrical updating was obviously the most urgent.

Up to several years ago, the plant generated most of its own power, using exhaust steam for kilns, presses, heating, etc. Four substations, all fed from a common metering point, had a total capacity of 5500 kva. All substation transformers were 7200-volt primary, 480-volt secondary. (The new plant substation secondary, however, provides 4-wire 480/277-volt secondary service for both power and lighting.)

Brunswick management was faced with the all-too-familiar closed circle of problems in its plans to modernize the old plant. Production demands had grown and changed drastically; only a few areas were still performing the same functions for which they were designed. But until the last few years profits hadn't been high enough to justify large-scale modernization. What money was available had to be spent on new production equipment to keep pace with changing markets. So the plant's supporting facilities, such as the electric power system, were modernized or expanded only when and where the new production equipment demanded it. The company was also handicapped by lack of a large engineering staff to handle any major modernization projects.

*Turn the page*

# GO-GETTER CUTS COSTS IN HALF; MAKES JOB SAFER

A leading chemical plant faced with the double explosion hazard of ethylbenzene fumes and aluminum chloride dust, solved its material handling problems – and saved money in the process – through the use of Revolvator's new fork lift trucks labeled Type Ex by Underwriters' Laboratories for Class 1 Group D explosion hazardous areas.

Previously, two men with a hand truck were required for this operation. Since the introduction of the Explosion Proof Go-Getter, one operator easily charges the hoppers in a safe manner with a minimum effort. "What used to be a dangerous, disagreeable job has now become a simple task," says the plant manager.

The explosion proof Go-Getter, available in 12 standard models, is but the latest development in Revolvator's better than a half century of experience in materials handling equipment covering standard walkie lift trucks, hand lift trucks, portable elevators and related equipment.

**REVOLVATOR CO.**
8761 TONNELE AVENUE, NORTH BERGEN, N. J.
SINCE 1904

**POWER RALLIES PLANT**
*Begins on page 238*

**FIRST INSTALLATION** was metal-clad primary fused switchgear to prevent one feeder failure from shutting down others.

For this reason, Brunswick decided to engage Cunningham-Limp Company of Detroit as consultants (and, later, as contractors) to examine the system and make recommendations. The major goals were:

1. Analyze the power system.
2. Produce a plan of action.
3. Improve worst spots first.
4. Arrange schedules to avoid production delay.
5. Utilize present equipment where possible.
6. Retire obsolete equipment.
7. Plan for long-range growth.

Study of the system began in October 1959, and most of the modernization schedule for 1960 was completed by Aug. 1. Electrical work took only a part of this time because Cunningham-Limp and the subcontractors were also working on changes in production equipment and other plant utility systems.

Let's examine the goals Brunswick set out to achieve and see how many worthwhile ideas turned up in this many-sided project.

## 1. SYSTEM ANALYSIS

For years the major emphasis at Brunswick had been on maintenance of the power system, rather than on system planning. There was no complete wiring diagram or plot plan of the system. No accurate data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# PICTURE THE PLACES WHERE YOU CAN USE LION Nōkōrōde. PROTECTIVE COATINGS

Do you need a non-breathing moisture-vapor barrier over insulation or to protect metal, masonry or other surfaces against atmospheric corrosion, weathering or immersion in water? Use Lion Nokorode Seal Kote.

Do you need an *insulating* coating which will deliver enough heat saving in one year to pay for its cost—plus protecting against corrosion and moisture penetration? Use Lion Nokorode K Kote.

These tough, durable coatings can be sprayed onto regular or irregular surfaces—faster than most coatings, with proper equipment. They adhere at any angle, and change shape without rupturing.

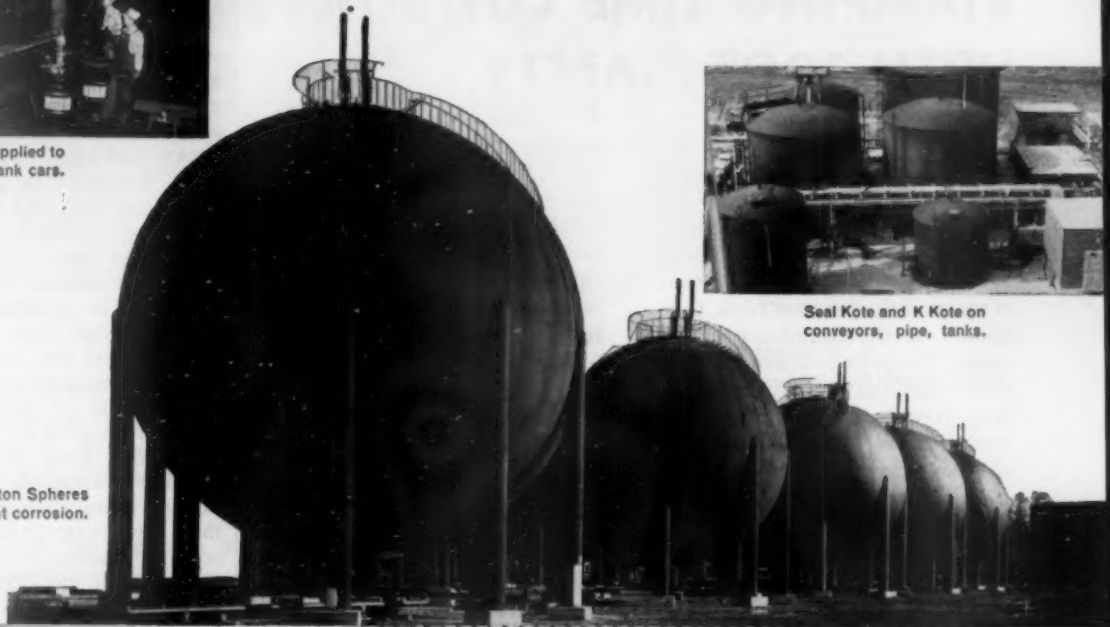
Lion Nokorode Coatings—as complete a line as you can find—are the products of continuing research by Lion and its parent company, Monsanto Chemical Company. Lion Nokorode products have been proven in use around the world, and are constantly being improved in the light of research and use.

Lion offers you on-the-job helps and the most complete file of technical literature in this field. Tell us your problem. We will send you the technical information which applies. Just mail the coupon below.

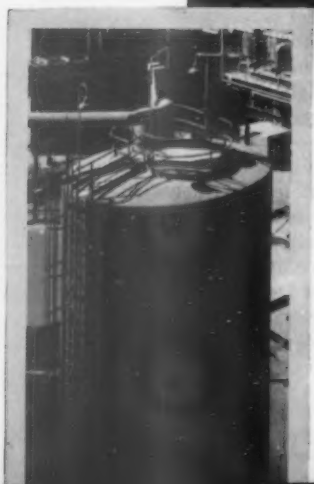
Seal Kote being applied to liquid chemical tank cars.



Seal Kote and K Kote on conveyors, pipe, tanks.



Seal Kote on Horton Spheres to prevent corrosion.



K Kote on soap and black liquor tanks at pulp mill.

Protective Coatings Section
**LION OIL COMPANY**
A Division of Monsanto Chemical Company
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My protective coatings problem is.....

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Please send me the appropriate technical literature.

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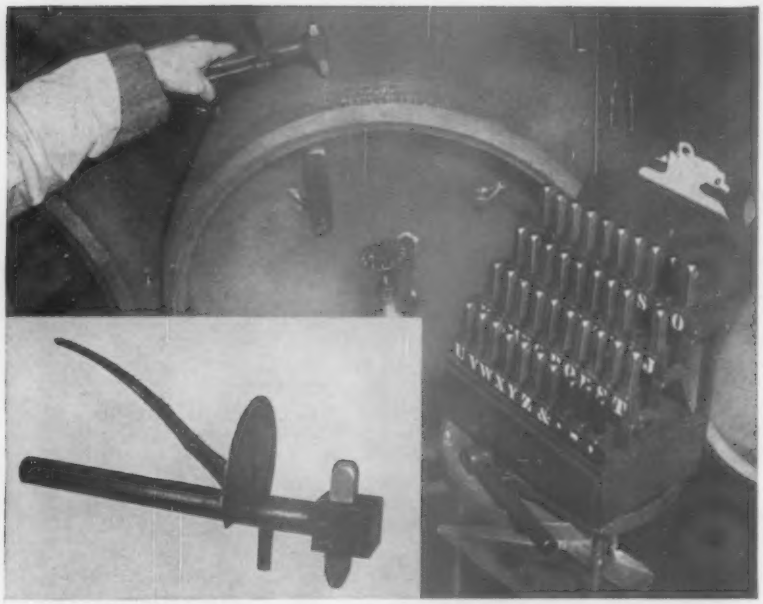


# STAMPING TIME CUT 50% WITH 100% SAFETY

The Pannier Rap-it-safe style single stamp holder cuts stamping time at least 50% . . . while entirely eliminating hand and finger injuries to the stamper. The holder keeps the worker's hand safely out of range of the hammer blow, thus adding to the confidence in his swing. The built-in guard protects the worker's hand effectively. The Rap-it-safe holder gives the worker a clear, unobstructed view of the stamp, permitting accurate placement. The impressions are clearer and more legible when this holder is used.

The Pannier Rap-it-safe holder is designed for fast, accurate heavy-duty stamping of steel boilers, tanks, plates or other products requiring multicharacter legends. Up to 13 characters per minute can be stamped accurately, depending on the operator.

The letters and figures, available in various sizes, are kept in the Pannier Stamp Rack, which has room for 40 characters. The stamps are held in individual slots, which keep them separate and easily identifiable. The stamps in their slots are convenient and ready to use. The Pannier Stamp Rack has a clamp board attached for holding the copy at an easily-seen height.

As each character is to be used, it is picked out of its slot in the stamp rack by gripping it with the holder. Squeezing the handle grips the single stamp firmly in the holder by positive pressure. After use, the character is replaced in its position in the stamp rack. When the handle is released, the stamp releases quickly, and the operator is ready to proceed with the next character.

Pannier engineers will be glad to consult with you on all your marking problems. For complete information, write:

**PANNIER MASTER MARKERS**

**201 Pannier Building, Pittsburgh 12, Pa.**

MASTER PANNIER MARKERS

**POWER RALLIES PLANT**

*Begins on page 238*

were available on loads on various feeders or on the rate of growth of individual loads. So Cunningham-Limp engineers had to start practically from scratch. The load on each transformer and major feeder was measured with portable recording and indicating instruments. The study took two engineers and two electricians working part time about four weeks. As data were obtained, drawings were made and revised.

## 2. A PLAN OF ACTION

Cunningham-Limp engineers came up with a 17-page report and 10 drawings that summarized their findings and recommendations. The first six drawings were line diagrams of the existing primary distribution system and individual substation and building wiring diagrams.

The seventh drawing was a table summarizing power and lighting loads for each floor of the 47 buildings, as well as source of power for each. The last columns listed lighting kw. and motor hp. Here, in one table, Brunswick for the first time had a complete picture of its total connected plant load.

The last three drawings represented the consultants' recommendations. The program was to be handled in eight steps. A block diagram showed the new substations and rearrangement of feeders.

Tabulation of loads under the new power system was organized by transformer load rather than by building location. It listed the six existing primary transformers, plus three new ones to be added. Vertical columns showed what connected kva., demand kva., demand-to-connected load ratios, and demand-to-transformer capacity ratios would be for each transformer during the eight steps for modernization.

The eight steps were shown by chronological divisions on a master planning schedule. Each step was complete in itself and represented significant improvements in safety, overload reduction, or removal of obsolete equipment.

Final column in the table showed calculated load and reserve capacity for each primary transformer. Future known loads were noted, together



For more facts Circle 529 on Reader Service Card

# NEW POWER-CRATER Engine in 3 NEW "F" SERIES LIFT TRUCKS

*gives outstanding performance ... unequalled economy*

**F30-24**
3000-lb capacity

**F40-24**
4000-lb capacity

**F50-24**
5000-lb capacity

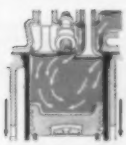
Superior mixing of fuel and air in POWER-CRATER engine gives the new "F" series trucks maximum power out of every drop of fuel . . . also a new high in combustion efficiency resulting in new fuel economy.

Greater power, coupled with proper balance and weight distribution, results in top all-around performance.

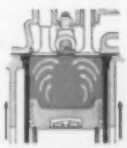
Let your Allis-Chalmers dealer show you what the POWER-CRATER engine — plus other outstanding features of the new "F" series trucks — can mean to you in terms of performance and savings. Send for Bulletin BU-640. Allis-Chalmers, Milwaukee 1, Wisconsin.

POWER-CRATER is an Allis-Chalmers trademark.

**Inside story of POWER-CRATER engine performance**

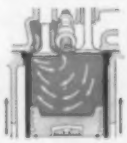


1 **EFFECTIVE MIXING** of fuel and air begins during intake, with swirling turbulence set up by unique crater-shaped piston — an Allis-Chalmers development.



2 **FINAL THOROUGH BLENDING** takes place during the compression stroke, as the violent turbulence continues.

3 **COMPLETE COMBUSTION** results from this proper blending of fuel and air.



4 **QUICK-CLEARING EXHAUST**— burnt gases clear rapidly and completely through large clear-flow manifold, permitting maximum air-fuel charge on intake.

BH-141

**ALLIS-CHALMERS**

***POWER* FOR A GROWING WORLD**



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# "Call FOSTER... they'll ship Switch Material PLUS"

Right! L. B. Foster Company will ship switch material "*plus*" any standard rail section (new or relaying), crane rail and accessories, and track tools —everything you need, at lowest possible costs. Foster is your fastest, most dependable source for every rail and track item required for industrial sidings or in-plant trackage.

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*Begins on page 238*

**MEZZANINE** in a former powerhouse holds a substation that will be double ended as load grows, adding a secondary tie.

with the transformer they should be fed from. All the tables (as well as the report) were prepared with a minimum of technical terms.

A new plot plan and one-line diagram of the revised power system finished off the consultants' analysis and recommendations.

### 3. WORST SPOTS FIRST

Brunswick could not afford to do everything at once, so it was important to establish a job priority, put worst things first in the work schedule for 1960. Here were some of the first areas tackled:

• **Electrical safety**—Electrical accidents, though not numerous, were accepted as a normal hazard of plant operation. Unsafe equipment and operating practices were both common—each a cause and a result of the other. At the utilization level, hundreds of non-dead-front-type switch and lighting panels were scattered around the plant. It wasn't hard to find exposed knob and tube wiring, open-type metallic and nonmetallic shielded cable, old conduit on which no continuity checks had been made for years, and controls and switches that did not meet today's code requirements.

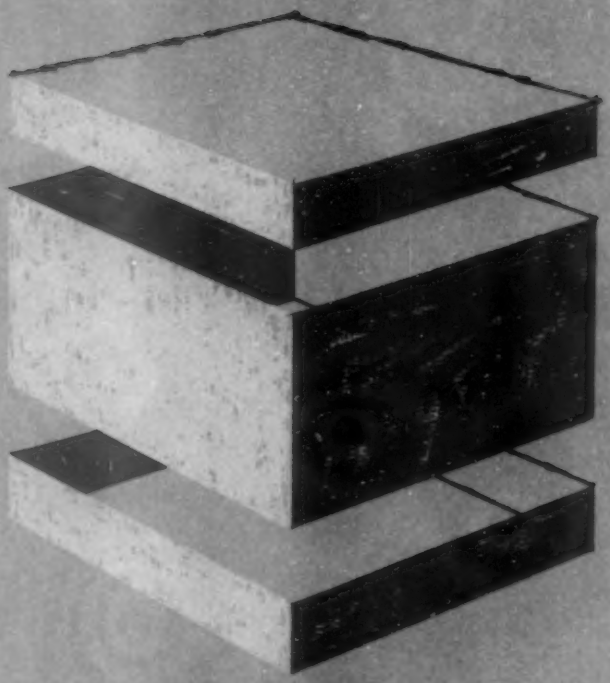
At the distribution voltage levels, hazards were fewer, but failures could be even more serious. Some oil breakers were wedged closed and reliance placed on primary fuses. Other breakers were feeding loads that could produce faults beyond rated interruption capacity.

Open-type knife switches were in common use. A flashover with re-

*Turn to page 250*



For more facts Circle 532 for Strapping, 533 for Framing, 534 for Stitching ➤

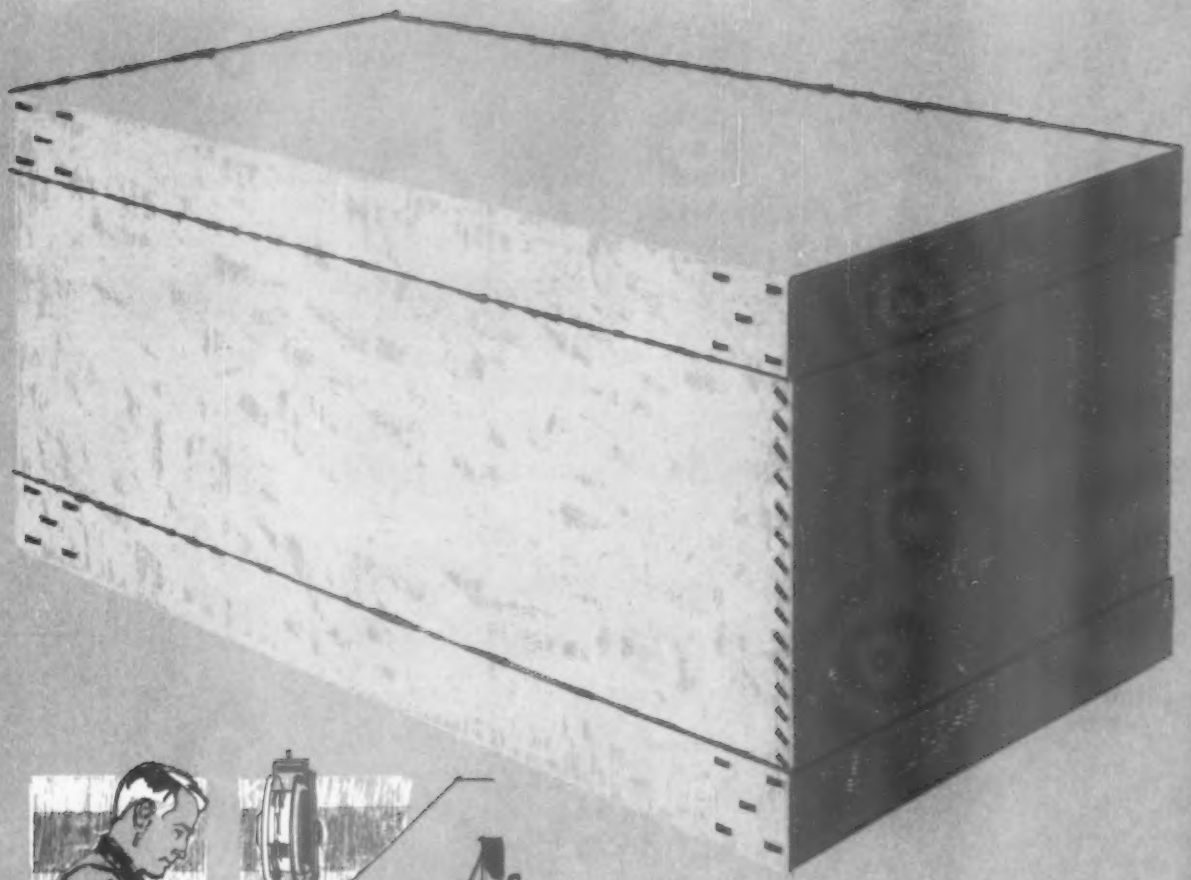


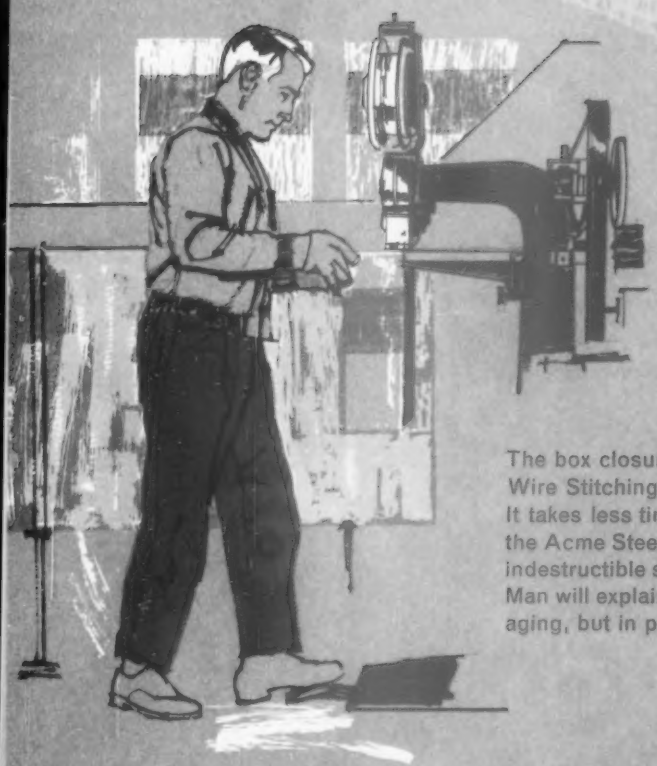
ACME STEEL

# PACKAGE PLAN

## for cutting costs

# STITCH it fast





The box closure and assembly economies made possible by Acme Steel Wire Stitching are setting records throughout industry. And no wonder. It takes less time, work and material per piece than taping or stapling. In the Acme Steel method, high-speed machines form and zip-out practically indestructible stitches from continuous coils of wire. Your local Acme Idea Man will explain how Wire Stitching can secure savings—not only in packaging, but in product assembly and literature binding.

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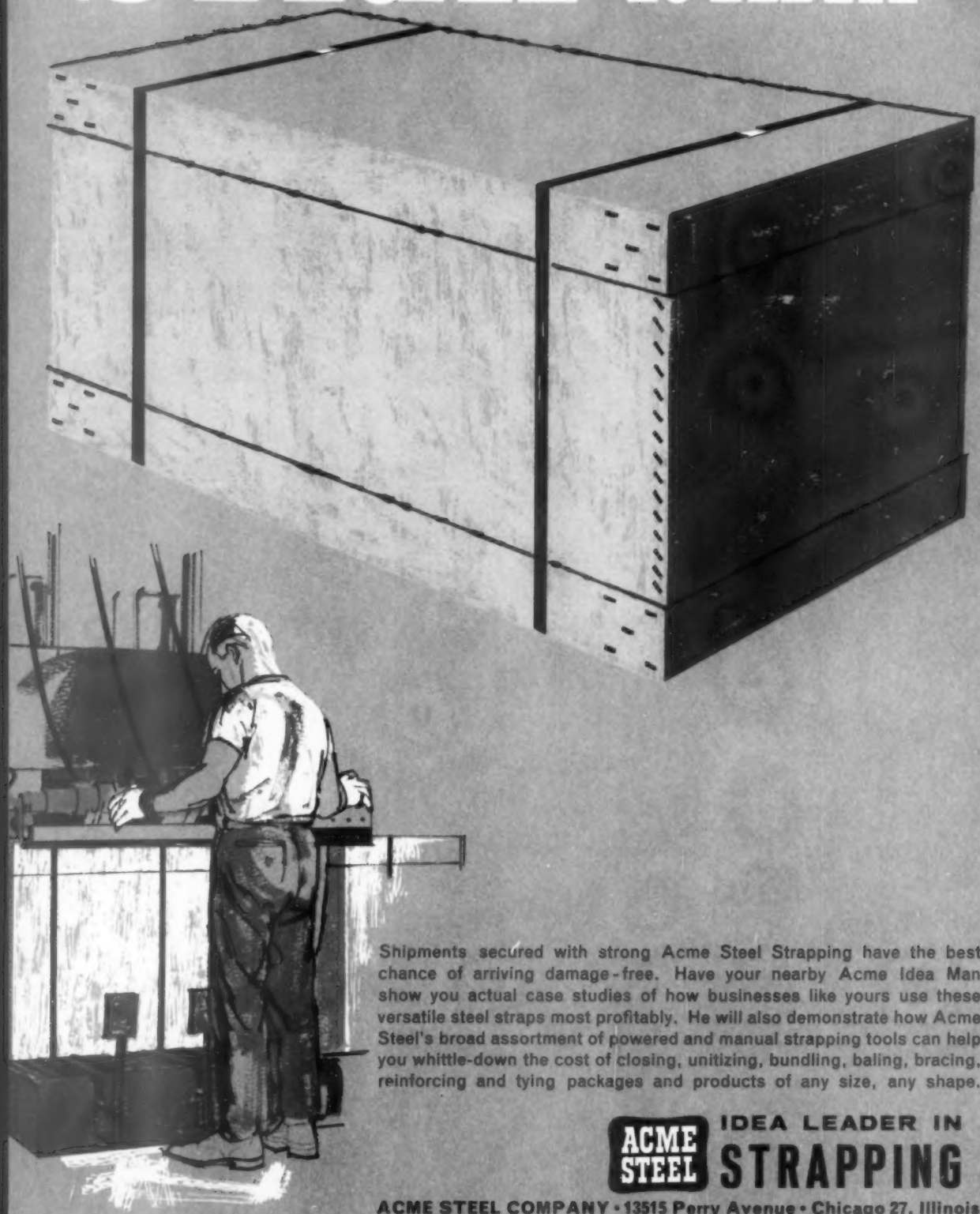
# STRAP it firm



Shipments secured with strong Acme Steel Strapping have the best chance of arriving damage-free. Have your nearby Acme Idea Man show you actual case studies of how businesses like yours use these versatile steel straps most profitably. He will also demonstrate how Acme Steel's broad assortment of powered and manual strapping tools can help you whittle-down the cost of closing, unitizing, bundling, baling, bracing, reinforcing and tying packages and products of any size, any shape.

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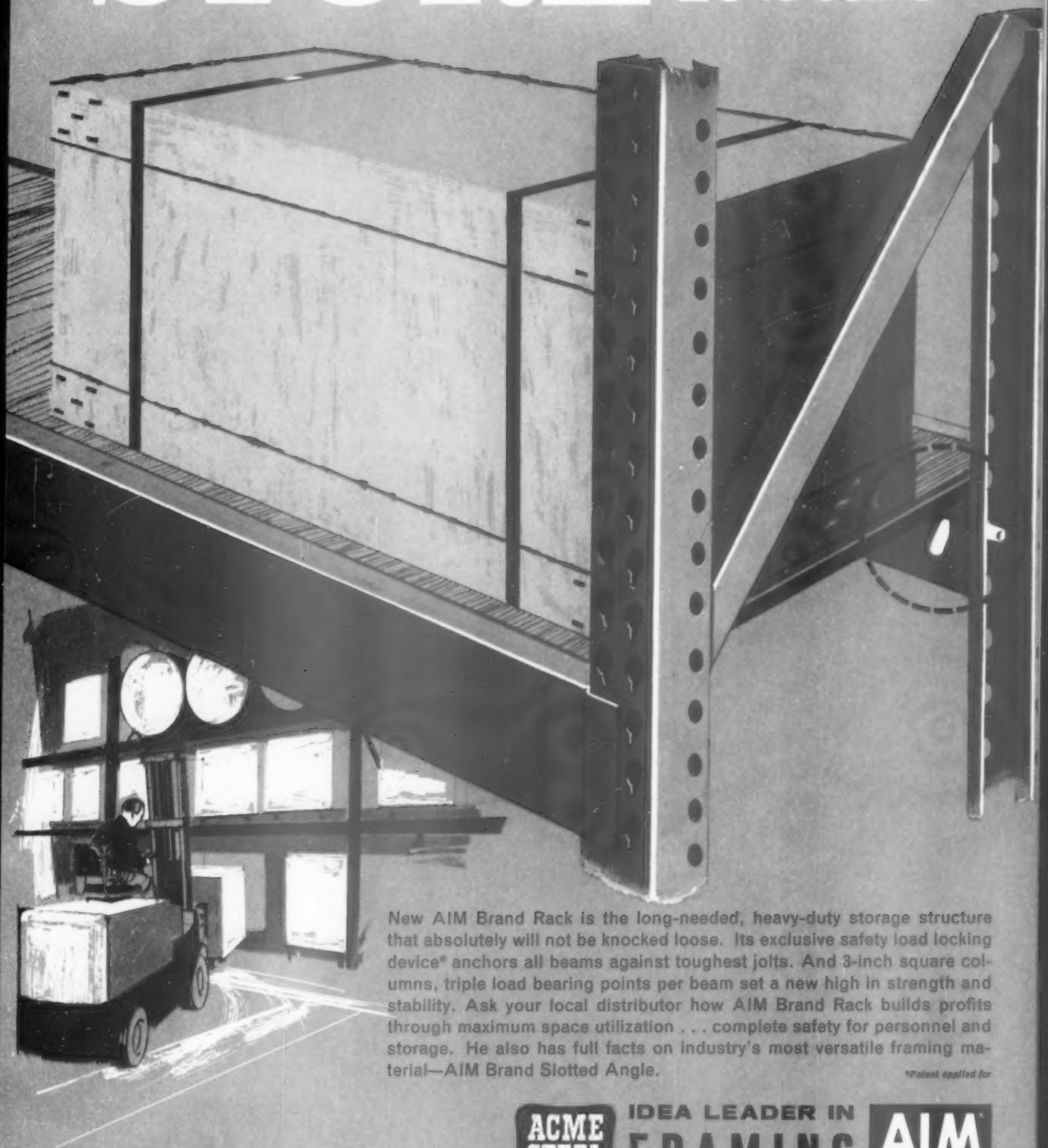
# STORE it safe



New AIM Brand Rack is the long-needed, heavy-duty storage structure that absolutely will not be knocked loose. Its exclusive safety load locking device* anchors all beams against toughest jolts. And 3-inch square columns, triple load bearing points per beam set a new high in strength and stability. Ask your local distributor how AIM Brand Rack builds profits through maximum space utilization . . . complete safety for personnel and storage. He also has full facts on industry's most versatile framing material—AIM Brand Slotted Angle.

*Patent applied for

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Remember . . . your Stromberg-Carlson Communications Consultant is only a local phone call away from you. He will be glad to analyze your communications problem and give you every possible help without obligation.

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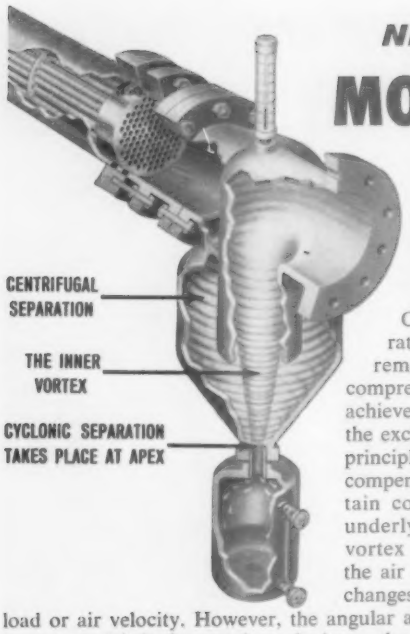


NEED BETTER

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(for your compressed air system)

Only the Adams CYCLONE Separator assures peak efficiency in the removal of oil and water from your compressed air system. Top operation is achieved from one-quarter to full load by the exclusive cyclone design. It is a proven principle of operation which automatically compensates for variation in load to maintain constant separating efficiency. The underlying feature is the inner cyclonic vortex formed within the unit itself by the air stream. The diameter of the vortex changes in proportion to variations in the load or air velocity. However, the angular air velocity, the RPMs, remain constant — and it is the angular velocity — the infinite changes of direction, which effect the separation of entrained particles at practically constant efficiency.

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WASSELL TWINS... SPEED UP OPERATIONS

INC.

Robert N. Orchard, president of Ray Burns, Inc., says, "After trying many control systems, we have found in Wassell Produc-Trol and Vu-Board, a system that gives us all the answers at a glance.

"The Vu-Boards are the answer for any kind of pre-load scheduling system. "The Wassell Produc-Trol panels enable us to follow through on each operation for prompt on-time delivery."

ANOTHER WASSELL PRODUCT

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*Begins on page 238*

sultant serious burns to the operator could easily occur. Oil-insulated transformers were installed in basements, where a fire could be disastrous. Locks on some electrical cabinets were missing or defective. In certain areas, only the electricians knew which switch shut off what load—the boxes were not marked. Many pieces of control and distribution equipment were operating in a carbon dust atmosphere without adequately sealed enclosures. Pile-up of conductive dusts reduced installation safety, increased fire hazards. Some rooms with breakers or transformers had only one exit.

In many ways, this electrical installation was typical of most older plants. And like most plants, Brunswick got by without major electrical breakdowns more through good luck than for any other reason.

Management went after electrical hazards first. The answer lay in the installation of modern, safer wiring and equipment, properly designed for the environment and foolproof against unauthorized operation.

• **Overloads**—The analysis showed many points where conductors, transformers, or breakers were overloaded. It recommended immediate steps to shift loads from overloaded equipment to adjacent circuits that still had reserve capacity. Overloaded conductors were to be removed and replaced with larger bus or wiring, or loads were to be split up and partially shifted to new or existing conductors.

• **Faults**—Brunswick's primary service had only a single line of defense against faults in the 7500-volt line serving several of the buildings. A lightning stroke or accidental contact between lines anywhere in this part of the direct circuit would have caused the power company breakers to open, shutting down the entire plant. This pattern of inadequate isolation of faults was also found in many lower voltage circuits. The consultants recommended that Brunswick install, as soon as possible, a free-standing metal-clad switchgear cubicle with an 800-amp. common bus and six individual fused switches to feed the five primary circuits, leaving one spare.

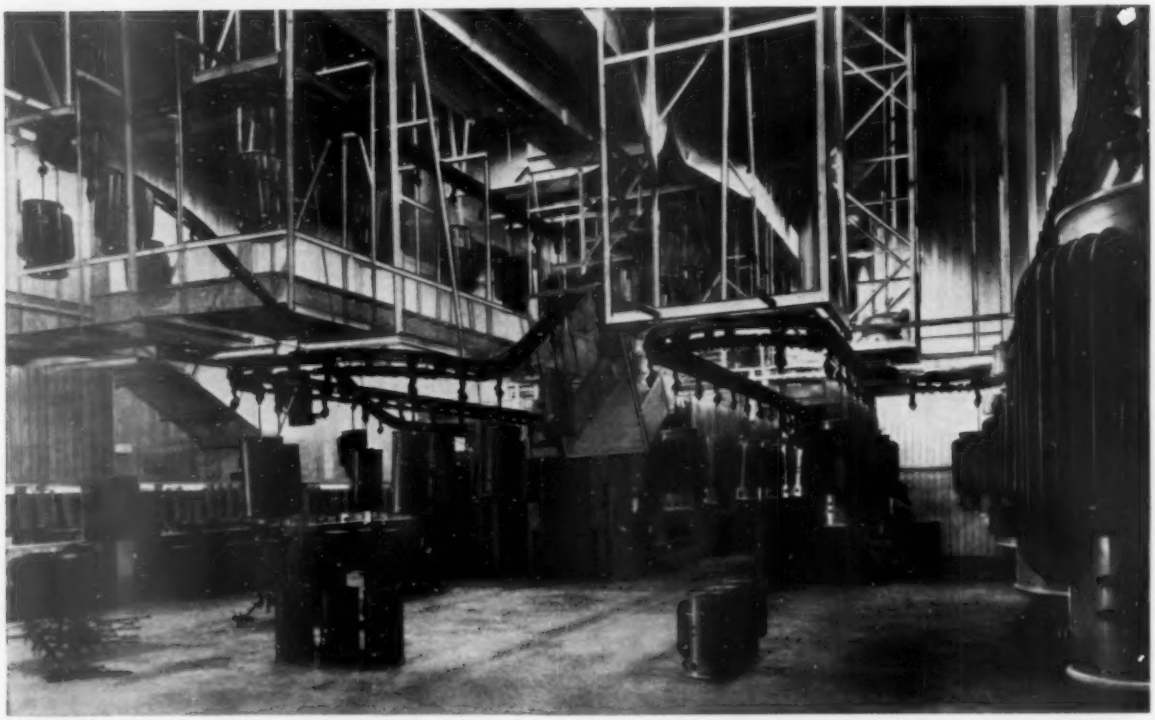
*Turn the page*



For more facts Circle 537 on Reader Service Card

# LINK-BELT Trolley Conveyors and Trukveyor provide

# OVERHEAD AND IN-THE-FLOOR STRAIGHTLINE PRODUCTION



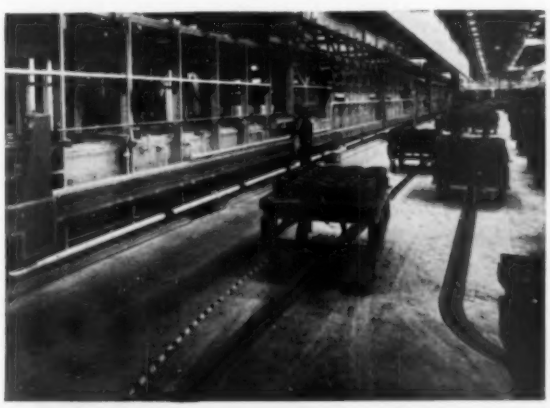
**Trolley Conveyor** takes complex tour in stride in completely enclosed paint room of new Westinghouse distribution transformer plant. Tanks at right move into position for primer. Those on left emerge from primer and first-coat ovens.

## Automatic "no hands" handling, steps up production at new Westinghouse transformer plant

Regular as clockwork, Link-Belt Overhead Trolley Conveyors and in-the-floor Trukveyor keep time with production demands at Westinghouse Electric Corporation's new transformer plant at Athens, Georgia. Every two minutes a transformer rolls off the line after a coordinated trip through many levels and processing steps.

Other Link-Belt equipment at Athens: completely automatic furnace conveyor system, three roller conveyor lines and a unique monorail lift conveyor. The latter stacks and retrieves cores from a bank of storage racks, coordinates the various processing steps into a continuous flow.

Link-Belt can solve your materials handling problems in the same way. Call your nearest Link-Belt office, or write for Book 2330 on trolley conveyors, and Book 2497 on Trukveyors.

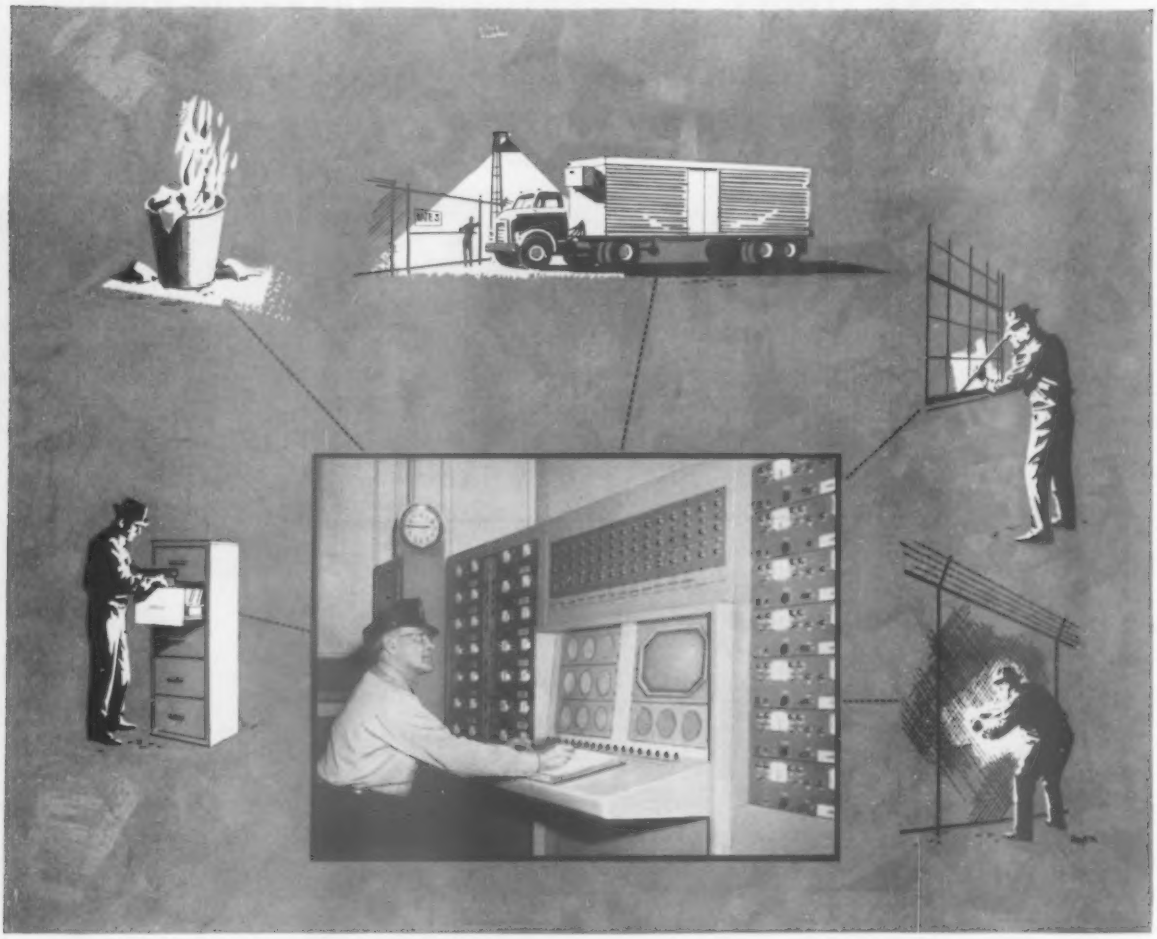


**Triple-Duty Trukveyor** carries cores to entry end of annealing furnace at left. After operation, Trukveyor carries them to milling machine for cutting. Formed cores then are replaced on Trukveyor for second pass through annealing furnace. Each truck carries a load of nearly 6000 lbs.

LINK-BELT

CONVEYORS

LINK-BELT COMPANY: Executive Offices, Prudential Plaza, Chicago 1. To Serve Industry There Are Link-Belt Plants, Warehouses and District Sales Offices in All Principal Cities. Export Office, New York 7; Australia, Marrickville (Sydney); Brazil, Sao Paulo; Canada, Scarboro (Toronto 13); South Africa, Springs. Representatives Throughout the World. 18,374



# How Honeywell electronics improves plant protection and lowers costs!

This completely new concept in protective systems enables one guard to do the work of many—more effectively. From a central control panel, he can instantly check the security of any building or area—even remote gates 20 miles or more away. Through electronic signals, the system employs all three means of detection—*physical* break in, *audible* noise created by the intruder and *motion* by anyone concealed within the plant. It detects any form of illegal entry, loitering, vandalism and sabotage, as well as fire. And it can provide complete surveillance of temperature, refrigeration, lights, boilers and flows.

No other method can begin to compare in savings and efficiency. By eliminating guard posts and increasing plant protection, this security system can pay for itself within a year, and go right on adding to your profits year after year. For every 24-hour guard post that you eliminate, you save $25,000. In larger plants, where more costs are eliminated, savings increase proportionately. *For a free survey* of your plant, call your nearest Honeywell office. Or write Minneapolis-Honeywell, Dept. FM-9-118, Minneapolis 8, Minn. In Canada, write Honeywell Controls Limited, Toronto 17, Ontario.

**Honeywell**

*First in Control*

HONEYWELL SINCE 1885

75 YEARS PIONEERING THE FUTURE



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**OBSOLETE** (and unsafe) low-voltage switchboards of open-type construction are being removed as the need disappears.

• **Long feeders**—Because the system grew without much long-range planning, loads were often added to the handiest feeder without considering its distance from the source. Voltage drop at some load points was beyond 10% and wide voltage swings were normal. (At one point, production supervisors could estimate welding shop production by the "blink-rate" of their office lighting.)

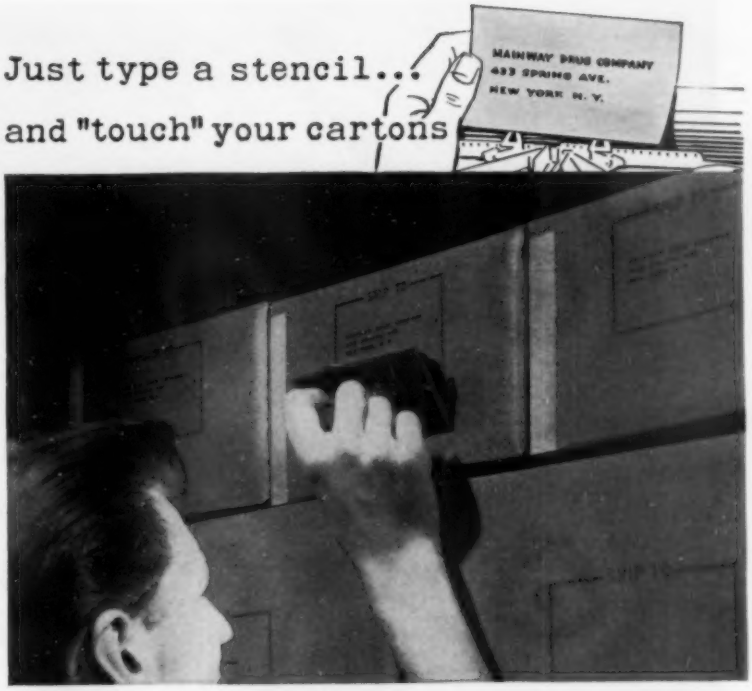
In one place, the study disclosed a 480-volt feeder made up of several sections of 500- and 800-amp. bus intermixed. Another 400-amp. branch circuit fed the machine shop and six other shops, extended about 1000 feet, and had a total connected load almost twice its full load rating. The answer here was to split the load and feed the extreme end from an adjacent substation.

However, the biggest aid in ridding the plant of long feeders was the installation of three new substations near the centers of load and reconnecting of existing bus duct to the new sources.

• **Loads between feeders**—As is typical of a system that "just grew," feeders supplied from the same bus had variations in loading. The study turned up dozens of examples of this, and recommended ways to get hundreds of kva. of "new" capacity by a simple shifting of connections.

*Turn the page*

Just type a stencil...
and "touch" your cartons

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Weber "Touch-Stenciling" replaces labels and stencils boards. It's fast, neat and systematic

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Shipping cartons, pre-printed with "Ship-To" label frames, are addressed by simply printing the customer's name and address within the frames with a Web-O-Print hand duplicator. It prints from a stencil that you can type or handwrite. Just a "touch" on the carton leaves a clear, sharp, permanent print.

With a smooth, one-hand motion 40 to 50 cartons can be addressed in a minute. After the shipment is addressed the stencil is thrown away, saving filing time and space.

Weber stencils can be prepared as part of your order-invoice writing procedure to save time and eliminate shipping errors. They can be cut as a by-product of forms typing on manual or electric typewriters, automatic accounting machines and other modern office equipment.

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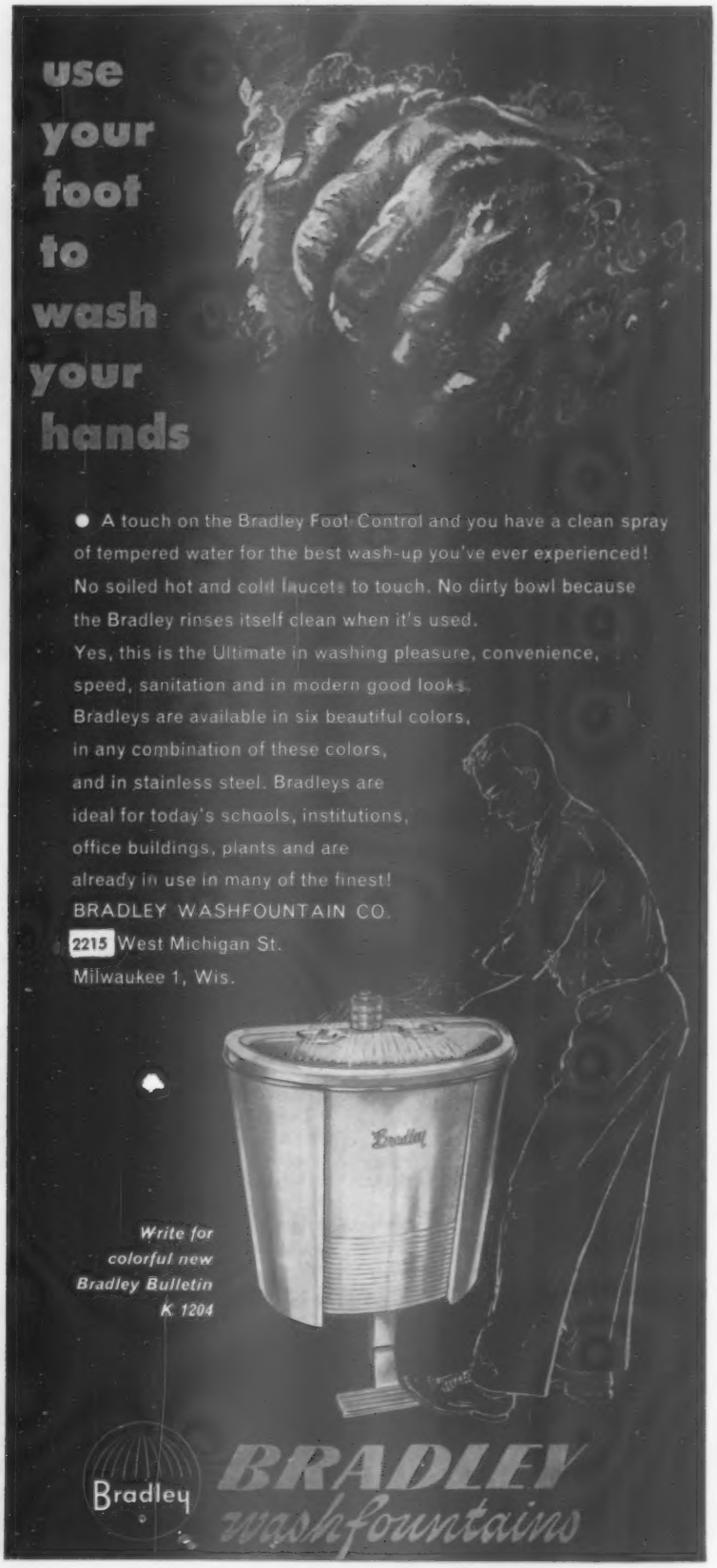
use your foot to wash your hands
● A touch on the Bradley Foot Control and you have a clean spray of tempered water for the best wash-up you've ever experienced! No soiled hot and cold faucets to touch. No dirty bowl because the Bradley rinses itself clean when it's used.
Yes, this is the Ultimate in washing pleasure, convenience, speed, sanitation and in modern good looks.
Bradleys are available in six beautiful colors, in any combination of these colors, and in stainless steel. Bradleys are ideal for today's schools, institutions, office buildings, plants and are already in use in many of the finest!
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Write for colorful new Bradley Bulletin K 1204
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## POWER RALLIES PLANT

*Begins on page 238*

### 4. NO PRODUCTION DELAY

The modernization steps were carefully planned so production areas and equipment would not be without power when work was needed to meet production schedules. The biggest improvement in the plant's primary service, the installation of the six-cubicle metal-clad fused switchgear, could be done only when power was completely off throughout the plant. Work had to be scheduled so the final cutover was made in one two-hour period (5 a.m. Sunday).

Projects involving installation or moving of production machinery were carefully coordinated with related electrical projects. Through close cooperation between production supervisors and outside contractors, work on new bus duct, convenience wiring, and new lighting was carried on without interfering with production.

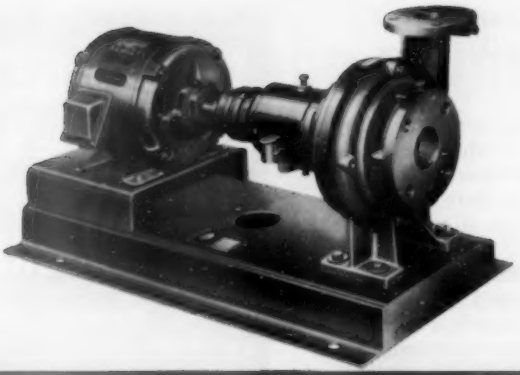
The big push was aimed for the plant's annual vacation shutdown in July. About 100 contractors' men from all trades worked around the clock to complete modernization work on production machinery and electrical equipment that couldn't be done during production hours.

### 5. PRESENT EQUIPMENT

At least one carload of obsolete wiring, conduit, switch boxes, panels, breakers, and switchboards was scrapped. But most of the equipment installed by Brunswick in the last 15 years was usable "as is" in the new system. Or it was moved to where it would serve as well as new components. Bus duct runs were shifted readily to new locations. Excess feeder lines were reconnected for use as tie lines between adjacent substations. And, eventually, existing motor control centers exposed to carbon dust will be enclosed in pressurized areas.

### 6. OBSOLETE EQUIPMENT

When the final stages of modernization are reached, no obsolete equipment will be in use, even though some components may still be usable at the time they are removed. This means indoor oil-

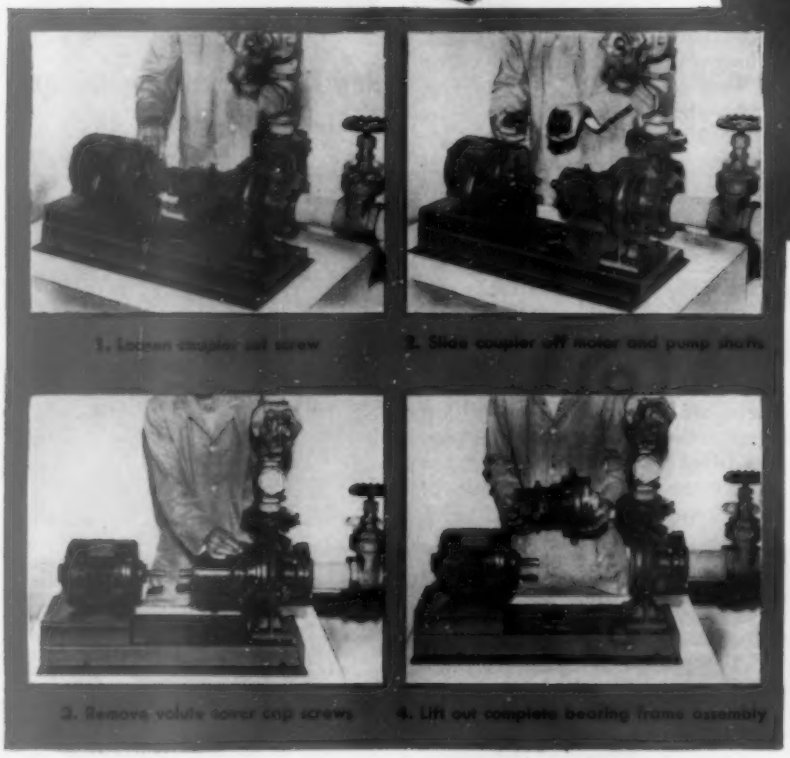


# EASY TO SERVICE

## THIS VERTICAL SPLIT CASE PUMP

offers all the advantages of horizontal split case pumps

# B&G SERIES 1510-B CENTRIFUGAL PUMP


1. Loosen coupler set screw
2. Slide coupler off motor and pump shafts
3. Remove volute cover cap screws
4. Lift out complete bearing frame assembly

The photos show how easily the complete bearing frame, including seal and impeller, can be removed without disturbing piping or motor leads. The unit is replaceable and interchangeable in all pump sizes within limits of material construction.

Other features of the 1510-B include—

**Mechanically balanced impeller.** Balancing chamber and pressure relief holes in the impeller reduce thrust to a minimum, lengthening pump life.

**Solid-type volute with support foot.** Can be left in pipe line when servicing pump—rugged construction absorbs piping strains.

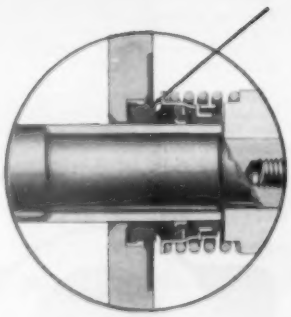
**Anti-friction roller bearings.** Timken bearings handle thrust and radial loads for smoother, quieter, more efficient operation.

**Oil lubrication.** No messy, undependable grease cups—circulating oil lubrication assures positive protection to bearings. Oil level indicator permits visual check.

**Rugged steel base.** Base mounted construction provides a sturdy platform for proper pump and motor alignment.

**100% factory tested.** Every pump hydraulically tested to meet specified conditions of head and capacity.

**Capacities.** To 2000 GPM, heads to 420 ft. 1¼" through 8" discharge.



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This exclusive feature assures long, trouble-free life. A carbon seal ring faces on a "Remite" floating seat—a material developed by B&G, so hard it will scratch glass—wear-proof and corrosion-resistant.

This mechanical seal is self-lubricating. A synthetic rubber bellows seals the shaft. Metal parts are of steel, bronze or stainless steel, depending upon the type of service.

**STOCK PUMPS FOR QUICK SERVICE**

Selected sizes of B&G Series 1522, 1531 and 1510-B Centrifugal Pumps are stocked at the factory for immediate shipment. Capacities to 550 GPM, heads to 180 ft. Send for Price and Selection Catalog.

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ERIEZ



**POWER RALLIES PLANT**

*Begins on page 238*

insulated lighting transformers, open switchboards, overhead cable with insufficient roof clearance will all be replaced with modern components.

Employees got a taste of what modern lighting can do in making work more pleasant and efficient when they visited the pinspotter plant. The old plant had been handicapped for years with an installation of thousands of non-industrial-type two-lamp 4-ft. fluorescent fixtures. These collected dust quickly, had no upward component in the lighting, and—when clean—provided from 10 to 20 foot-candles of light.

Most of the plant is being relighted in the first phase of the modernization. Other areas will be improved in succeeding years. The new lighting levels will be near 40 foot-candles—still below latest recommendations, but a dramatic improvement. And there will be much less need for local lighting. Furthermore, the new 8-ft. high-output fixtures are ventilated to keep dust from collecting. Walls and ceilings are being painted a lighter color to reflect the upward component of light from the new fixtures.

### 7. LONG-RANGE GROWTH

The study put planning for the future on solid ground for Brunswick. It convinced the company that electrical loads may well double within 10 years; that piecemeal planning of its system is too expensive. At the end of the 1960 modernization, the average primary transformer will have a demand-to-capacity ratio of 54%. As loads on the new substations approach 80 to 90%, the substations will be double-ended. This will double capacity and provide a secondary tie to take care of maintenance or emergencies. All new substations will be unit type to allow for orderly growth. As more primary circuits are added, the metal-clad primary fused switchgear can be readily expanded.

Power factor correction will be added as soon as data on actual values for new plant loads are obtained. Capacitors will be added near the point of poor power factor loads. This will release more system capacity for growth. **END**

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Erium-powered*
PLATE MAGNETS
Greatest magnetic strength per dollar ever offered!

**New Construction and Design ...New Magnetic Power**

Protect your machinery and production. Safeguard your product quality and reputation. Eriez Series 17 Plate Magnets can pay for themselves many times over in many ways.

All welded steel and stainless steel construction is standard on these all-new plate magnets in every model. They're more compact and rugged than previously available models . . . and designed to assure ease of installation in chutes, spouts, ducts, feed tables, and housings; and for suspension over screens, moving conveyors, etc. Wide mounting flange for better, easier dust-tight installation. Uniform dimensions for greater interchangeability.

Tops for performance because of their Erium-powered* magnetic circuit providing intense concentration of power in the most essential areas (three strengths available).

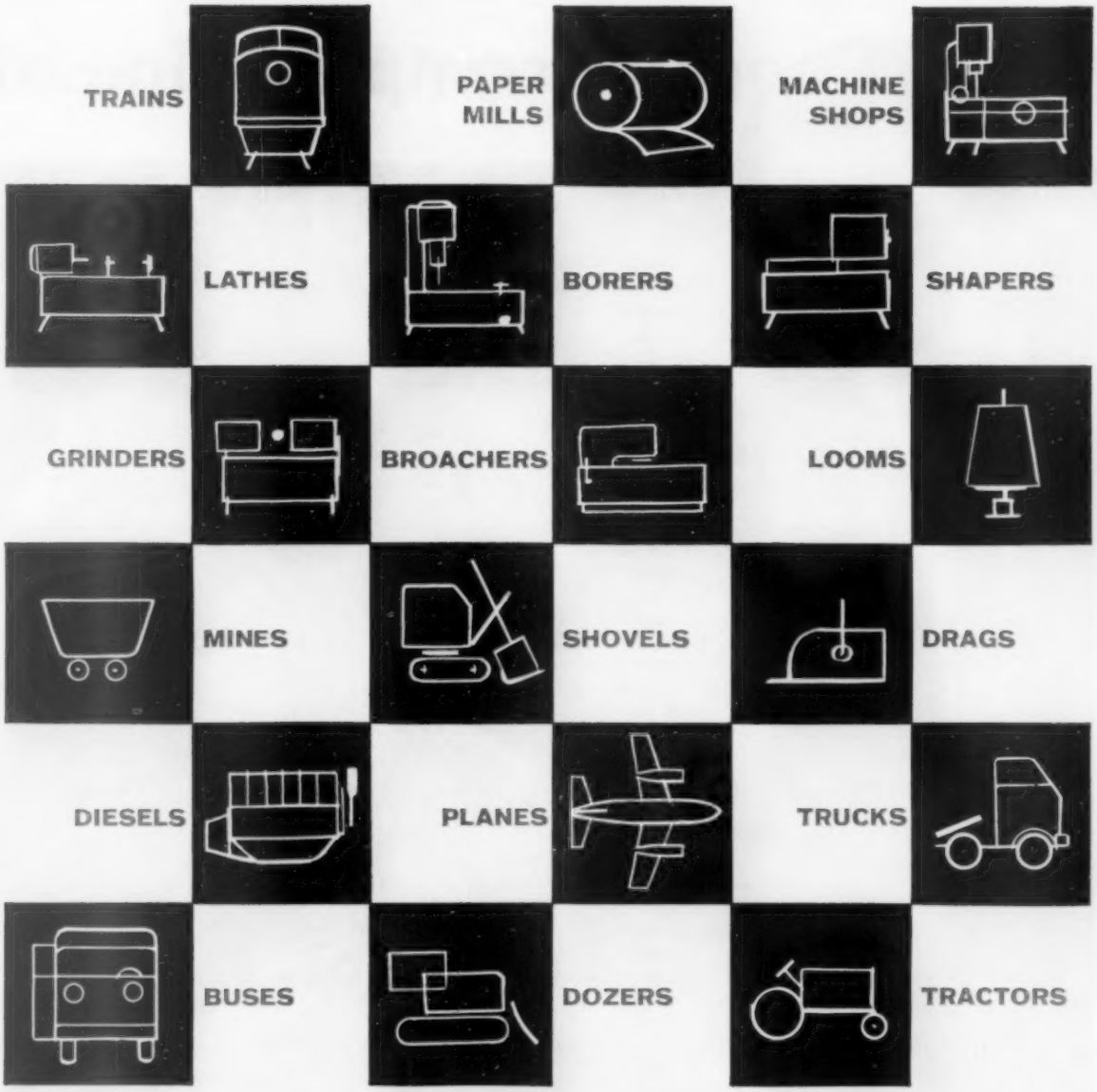
**Erium—an exclusive, high quality permanent magnetic power source specifically designed and energized by Eriez.*

**Here's the finest, most versatile plate separator performance at the lowest dollar cost. Write today for complete data on Series 17 Plate Magnets to:**

Eriez Mfg. Co., 70-JB Magnet Drive, Erie, Pa.

ERIEZ

# If you manage or operate any of these...

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# "Now get immediate of complete line of

A. T. Gallagher, Manufacturing Superintendent, Delroyd Worm Gearing.

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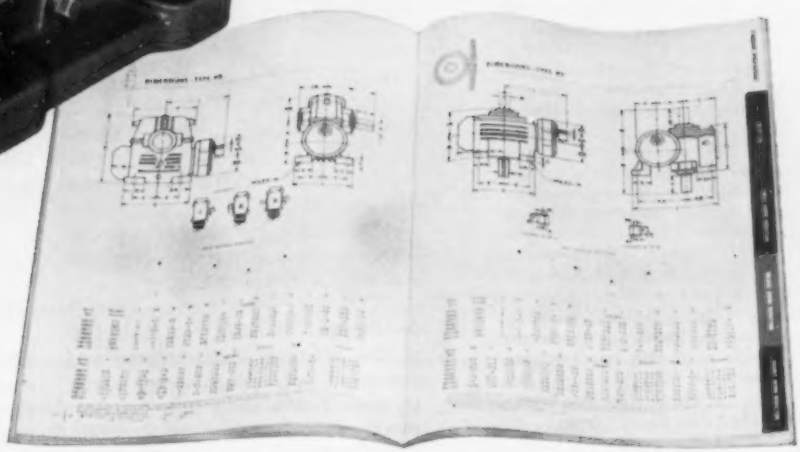
*1⅛" center distance, fractional horsepowers — to 12" center distance, 152 horsepower. Reducers to 36" center distance with horsepower capacities to 700 are supplied as standard. Larger units to meet any requirement can be supplied on special orders.

# delivery
# DELROYD worm gearing..."

**DELROYD worm gearing**
**gives you these superior design features:**

- Exclusive involute helicoid thread form for highest load capacities
- Centrifugally cast bronze gear for increased mechanical ratings
- Fan cooled finned housings for higher thermal ratings
- Lower weight per horsepower
- More horsepower per dollar

**NEW full color 84-page Delroyd Catalog:**



Now available — the worm gear industry's newest, most complete catalog. Contains all basic design and application data, selection charts, ratings and service factors — plus illustrations in full color. For your free copy, write on your company letterhead to: Delroyd Worm Gearing, De Laval Steam Turbine Company, Trenton, New Jersey.

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# FACTORY CATALOG NEWS

For more about these items, circle numbers on Reader Service Card next to back cover.

## AUXILIARY

**1—Airfoil Bladed Fans.** This 60-page bulletin (No. A-1103) discusses features of three classes of fans, and lists applications. Has 30 pages of capacity tables for 15 sizes in single- and double-inlet construction. *American-Standard.*

**2—Dust Separators.** Selection, installation, and performance data for Dual-Clone separators are outlined in Bulletin D-20 (8 pages). Multiple groupings handle several systems of dust collection and higher air volumes. *The Day Co.*

**3—Air Compressors.** Centrifugal compressors with capacities from 5000 to 38,000 cfm. and 1000 to 8000 bhp. are described in 20-page bulletin (No. 175). Gives design features, frame sizes. Cut-away drawing, photos. *Clark Bros. Co.*

**4—Packaged Air Conditioners.** Here's a 12-page manual (No. 6022) that covers heating, refrigeration, heat transfer, and air-conditioning products. Has specifications, data on capacity, heating coil, ratings. *Dunham-Bush, Inc.*

**5—Fan Cooling Towers.** Centrifugal towers for indoor installations requiring ductwork runs are shown in 4-pager (ECKB-601). Tower sizes: from 5- to 30-ton capacity for horizontal or vertical air flow. *Halstead & Mitchell Co.*

**6—Pumps.** Bulletin No. 100 (20 pages) discusses characteristics and operation of progressing cavity pumps. Tables show how to select pumps for various applications. Specifications, dimensional drawings, photos. *Robbins & Myers, Inc.*

**7—Air Sampler.** This 4-pager (IH-4) tells about unit that measures air containing particles as small as one 100th of a micron in diameter. Has pump and high-speed motor built into casing. For outdoor, indoor sampling jobs. *Staplex Co.*

**8—Ventilating Equipment.** Fibrous glass duct fans that resist corrosion are shown in 4-pager (No. 1117). Describes special corrosion-resistant materials and coatings used on fans and blowers. Photos. *Hartzell Propeller Fan Co.*

**9—Pumps.** "How to Solve Pumping Problems" is a useful 36-pager (Form 3060). Covers explanation of rotary gear pumps; sample problems; technical data, with graphs, viscosity conversion tables, diagrams. *Roper Hydraulics, Inc.*

## MECHANICAL

**10—Clutches.** Bulletin No. 260 (12 pages) describes dual torque-locking and positioning devices that drive, position, over-run and backstop in clockwise and counter-clockwise directions. Diagrams show operation. *Formsprag Co.*

**11—Thrust Bearings.** Advantages of cylindrical roller precision thrust bearings are outlined in Catalog PT-659 (28 pages). Data on dynamic and static bearing capacities, new sizes of crane hook bearings, etc. *Rollway Bearing Co.*

**12—Speed Drives.** Details on all types of units in new 400 Series, with or without motors, are given in 16-pager (ZM-400C560). Illustrates stepless variable speed drives for fractional hp. applications, other features. *Zero-Max Co.*

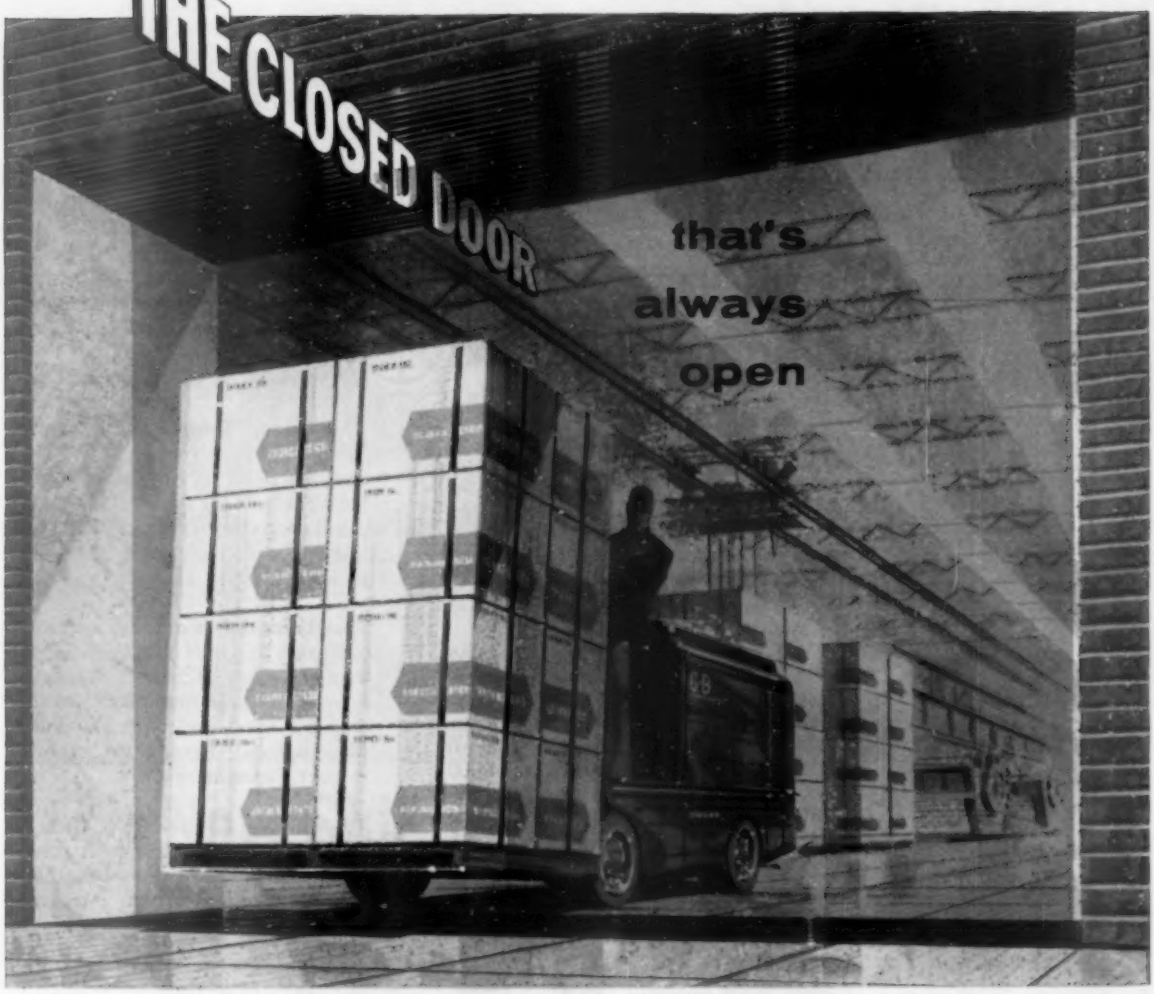
**13—Seals.** Maker's line of compact, ready-to-install seals is discussed in Bulletin AD-150 (8 pages). Lists temperature, pressure, shaft speed, other operating information. *Garlock Inc.*

**14—Speed Variator.** This 8-page booklet (GEA-7018) describes adjustable speed drive which uses Thyratron tube to convert a-c to d-c power. These Thymotrol drives are general purpose, ¾ to 4 hp., single phase. *General Electric Co.*

*Turn the page*

*In industry today no blueprints for new construction, no plans for remodeling can ignore the concept of traffic flow as an integral function of architecture. One of the boldest expressions of this idea in years is the American Air Curtain.*

# THE CLOSED DOOR that's always open



The American Air Curtain . . . a doorway that's sealed against heat or cold, dust or fumes—against everything but people and products! A gentle curtain of air, thermostatically controlled, separates and insulates areas having different temperatures, atmospheric pressures or humidities. In industry today applications of the American Air Curtain are dramatic. Any type of operation can be confined to its own area, unaffected by the traffic of men and machinery. It's the boldest innovation in architectural engineering in years: the closed door that's always open.

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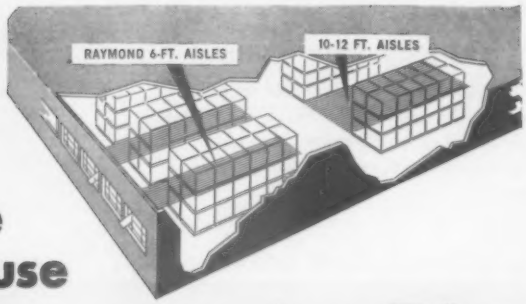


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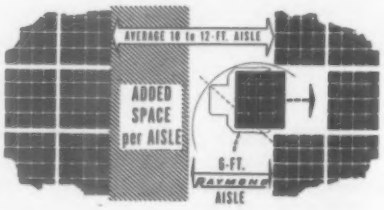
**WHY BUILD OR RENT!** There's space to be had right in your present warehouse. RAYMOND narrow aisle trucks eliminate wasteful 10 and 12 foot aisles . . . right-angle tier pallet loads from aisles **as narrow as 6 feet!** More storage space is gained . . . capacity increased up to 50%.

RAYMOND electric straddle type trucks are extremely compact, have an offset drive wheel with 200° turning radius, permitting close-quarter operation in narrow aisles. 12 and 24 volt models. Capacities: 2,000, 3,000, 4,000 lbs. Low-cost lease/rental arrangements available. Send for bulletin today!

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( ) Please send electric truck bulletin

( ) Please send information about lease/rental plan

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For more facts Circle 548 on Reader Service Card


## FACTORY / CATALOG NEWS

*Begins on page 260*

For more about these items, circle item numbers on Reader Service Card next to back cover.

**15—Adjustable Speed Drives.** Two 8-pagers describe non-electronic, full-wave d-c motor drives. No. SL-351-460 covers Size 1 (1/6, ¼, 1/3 hp.); No. SL-352-560, Size 2 (½ and ¾ hp.). *Cleveland Machine Controls, Inc.*

## PIPES AND VALVES

**16—Throttle Valves.** Bulletin No. 460 (4 pages) discusses Le-Hi Series 2500 valves for safe control of compressed air on pneumatic operating equipment. Design features, performance details, hose accessories. *Hose Accessories Co.*

**17—Tubing Tools.** This comprehensive 32-page Catalog No. 3121 describes and illustrates over 75 tools and kits for tubing work. Applications: cutting, flaring, bending, reaming, refacing, sizing. *The Imperial Brass Mfg. Co.*

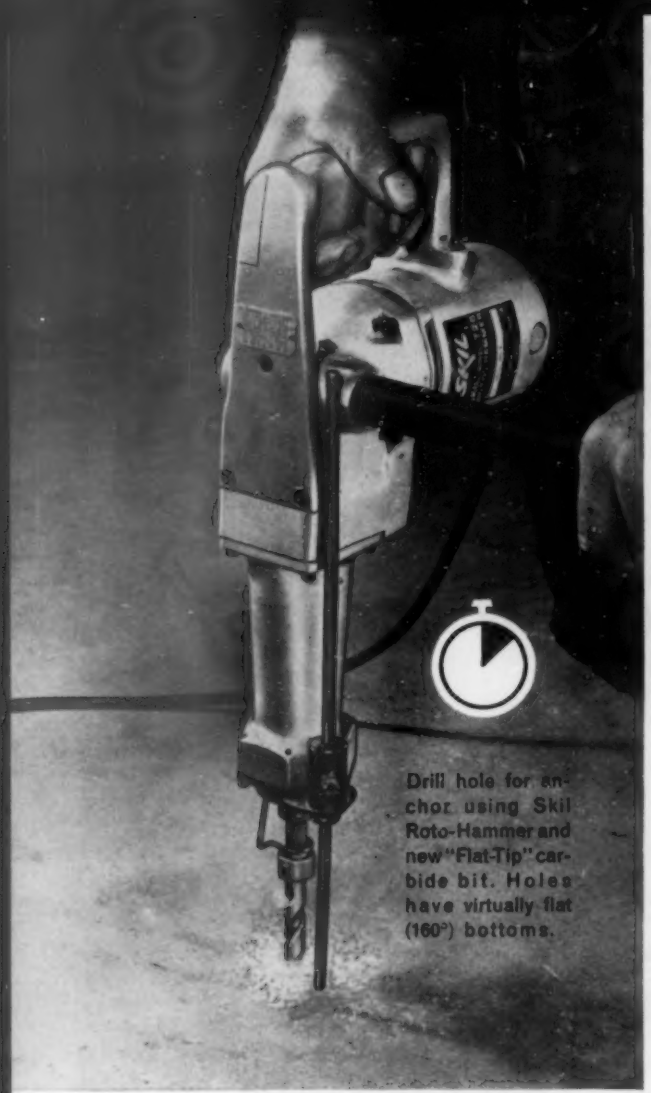
**18—Transition Couplings.** Here's a 4-pager that tells about company's metallurgically bonded stainless-aluminum coupling for joining stainless steel pipe to aluminum pipe without flanges or gaskets. *Project Fabrication Corp.*

**19—Clamps.** Booklet No. 5-60 is a pocket-size 16-pager with information on standard clamps used for hose, flexible plastic pipe, duct connections, and unusual applications. *Wittek Mfg. Co.*

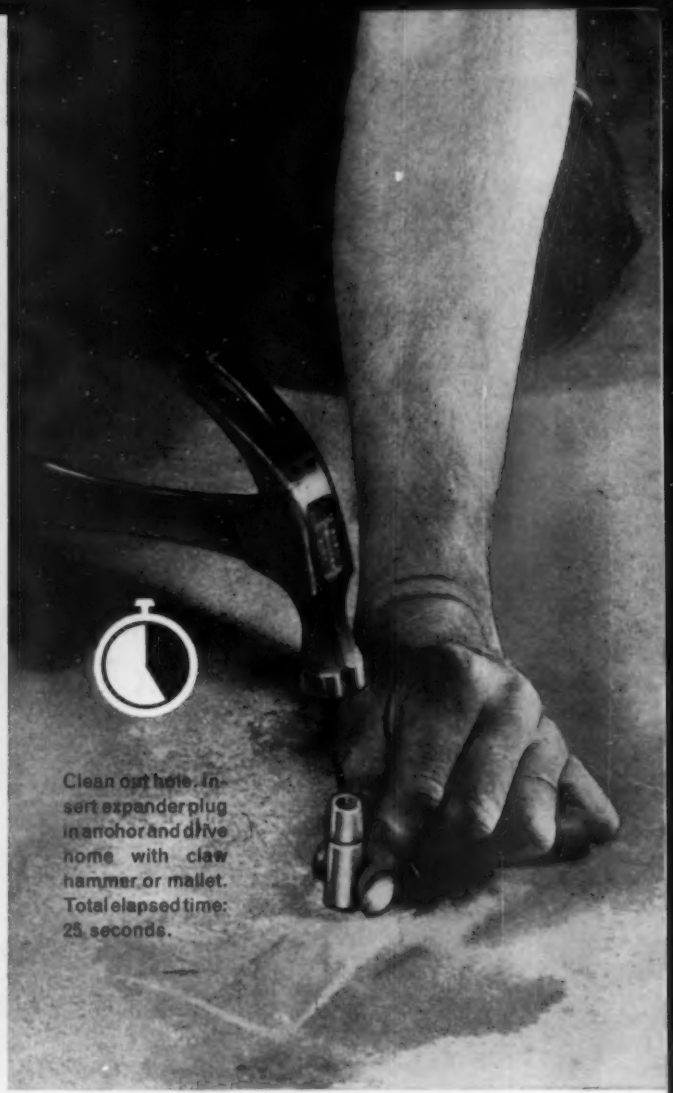
**20—Electrically Operated Valves.** Descriptions, specifications, and optional features are set forth in 20-page bulletin (91024). Gives flow control, mounting, other data for these 2-, 3-, and 4-way outlets. *Airmatic Valve, Inc.*

**21—Butterfly Valves.** This 4-page supplement to Catalog 307 has new information on valves for control of large volumes of liquids or gases. Shows variations of light- and heavy - duty wafer - style valves. *Mason-Neilan, Worthington Corp.*

*Turn the page*



Drill hole for anchor using Skil Roto-Hammer and new "Flat-Tip" carbide bit. Holes have virtually flat (160°) bottoms.



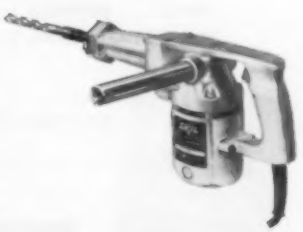
Clean out hole. Insert expander plug in anchor and drive home with claw hammer or mallet. Total elapsed time: 25 seconds.

# New Skil method sets anchors* 400% faster at 1/3 the cost...

## using Model 726 Roto-Hammer and new Skil "Flat-Tip" Carbide Bits

| COMPARISON TEST | | | | | |
|---|---|---|---|---|---|
| Based on setting 1000 self-drilling anchors for ⅜" bolts in 9/16" diam. holes (labor at $3.00 per hr.) | NEW SKIL METHOD | 1 No. 23536 Flat-Tip Bit used | 6.80 hours labor required | $37.40 total cost (labor and bit) | 3.7¢ cost per anchor setting |
| | CONVENTIONAL METHOD | 1 chuck wrench needed | 28.33 hours of labor required | $94.52 total cost (labor and chuck wrench) | 9.4¢ cost per anchor setting |

NOTE: Cost of anchors (same for both tests) not included.



**Automatic Power Rotation.** Model 726 drills holes without tiresome hand turning of star drills. Low maintenance. No springs to break.

Ask your Skil distributor for a demonstration. Look under "Tools—Electric" in the Yellow Pages. Or write Skil Corporation, Dept. 117 I, 5033 Elston Avenue, Chicago 30, Illinois. In Canada: Skiltools Limited, Trenton, Ontario.

*Self-drilling and expansion type shields, also new types about to be announced.

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REMOVING CHIPS FROM WATER PUMP PASSAGE HOLES AFTER MACHINING. CHRYSLER ENGINE PLANT, DETROIT, MICH.

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Operations performed here by Spencer vacuum cleaners include:

• Removing chips during assembly of head to block • Cleaning oil filter pad inlet passages • Automatically cleaning bearing cap assembly on block • Automatically removing core sand from engine block castings • Cleaning floors and conveyors.

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## FACTORY / CATALOG NEWS

*Begins on page 260*

For more about these items, circle item numbers on Reader Service Card next to back cover.

**22—Positioners.** Catalog J-170 (8 pages) and SRBc 24-60 (4 pages) discuss built-in positioners for 4- and 6-in. sliding gate control valves. Include conversion kits for valves. Applications, charts, ratings, etc. *OPW-Jordan.*

## ELECTRICAL

**23—Motors.** This 12-pager describes fractional hp. electric motors, blowers, replacement kits, brackets, fan blades, and accessories. Items are for replacements, in-plant uses, production applications, etc. *Redmond Co., Inc.*

**24—Raceways.** Surface metal raceways and fittings, multi-outlet assemblies, and lighting equipment are covered in Catalog No. 22 (pocket-size, 152 pages). Capacity and other tables, alphabetical product index. *The Wiremold Co.*

**25—Plug-In Bus Duct.** Specifications, applications and other information are given in this 28-page data booklet (30-661). Includes all details needed to lay out, specify, and install these bus ducts. *Westinghouse Electric Corp.*

**26—Two-Way Radio.** Bulletin ECR-497B (24 pages) describes frequency allocations and various combinations of two-way radio in each frequency. Shows difference between tubed equipment and other models. *General Electric Co.*

**27—Control Equipment.** Break-glass and other switches, control stations for switches and relays, and relay panel for gas valve are shown in 16-page bulletin (No. 57-57). *Automatic Switch Co.*

**28—Brakes and Clutches.** Here's a colorful 8-pager, "Tailored Torque," that explains company's operating principle, and several clutch-brake applications. Outlines advantages. Photos. *Warner Electric Brake & Clutch Co.*

*Turn to page 268*



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For more facts Circle 551 on Reader Service Card ➤

*This insert printed with Day-Glo litho ink. Day-Glo paint is even brighter.*

# Day-Glo® shouts safety first!

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*BEND IT . . . AROUND CORNERS AND OVER OBSTRUCTIONS!*

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*SAW IT . . . WITH AN ORDINARY HAND SAW OR SCORE IT WITH A KNIFE!*

Unique new "K&M" KAMWALL gives you all the advantages of an asbestos-cement structural sheet and then some! It conforms to irregular surfaces and foundations . . . permits unusual design and architectural effects. KAMWALL is ideal for tile floor underlayment, for fireproof interior partitions, fire barriers, furniture, plus 101 other applications where fire, vermin, dampness, and rot may be a problem. Its smooth surface makes it readily adaptable to all types of finishes. Painting enhances its beauty. And KAMWALL is so workable, all fitting and cutting is easily done on the job with ordinary carpenter's tools. KAMWALL can be stapled . . . or nailed close to its edge without predrilling. It permits light, narrow framing members. Such workability saves labor, time . . . reduces on the job breakage. Write today for a sample of KAMWALL and additional information. Get all the facts—fast! Keasbey & Mattison Company, Ambler, Pa. Dept. B-3890.

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For more facts circle 552 on Reader Service Card

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# Practical Idea for the Production Man

Efficient electric hoists...to move materials overhead and release floor space for more valuable operations.

CM HOISTS

**CM LODESTAR ELECTRIC CHAIN HOIST**
½ to 2 ton capacities—First truly heavy duty version of small electric hoist. ½ ton model weighs only 51 lbs. Heavy duty self-adjusting brake. Upper-lower safety limit switches. CM-Alloy load chain.

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½ to 5 ton capacities—Compact, enclosed design. Low headroom. Continuous duty motor with thermal overload protection for heavy duty service. Precision bearings and helical gears for long life. Only 110 volts at push button control.

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Rugged lightweight hand hoists and pullers...to make your job easier and safer

**CM CYCLONE HAND HOIST**
¼ to 10 ton capacities—Easy to carry and lift. One ton model weighs only 36 pounds. Made of tough aluminum alloy. CM-Alloy load chain. High efficiency. Lifetime lubrication.

**CM PULLER THE "ONE MAN GANG"**
¾ to 6 ton capacities—Lifts or pulls at any angle. Lever handle operation. Automatic load brake holds at any point. ¾ ton model weighs only 13 pounds. CM-Alloy flexible load chain.

**ALSO...** *CM Trolleys and Cranes*

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## FACTORY / CATALOG NEWS

*Begins on page 260*

For more about these items, circle item numbers on Reader Service Card next to back cover.

**29—Transformers.** This 8-page bulletin (9-013) discusses transformers for resistance welders. Photos of primary coil winding and insulation, prepared secondary coil, and completed transformers. *The Taylor-Winfield Corp.*

**30—Electrical Connectors.** These 30 pages present new electrical fittings and accessories. Bronco-Grip line includes connectors for both copper and aluminum wires. Has useful illustrated index. *Western Insulated Wire Co.*

**31—Tubes.** Here's a helpful 8-page Interchangeability Guide that lists about 9000 tube types. Common types are tabulated alongside direct replacements and their electrical equivalent types. Has consulting service. *Raytheon Co.*

**32—Force Control Switches.** Bulletin No. 49-E (6 pages) discusses switches that operate in compression or tension and can trigger four separate operations. Also covers new sub-miniature models. Photos. *W. C. Dillon & Co., Inc.*

**33—Motors.** General and special purpose motors for most fractional and integral hp. needs are listed in 8-page illustrated Motor Selector (L-1661A). Includes information on generators, bench grinders, speed reducers, other products. *Howell Electric Motors Co.*

## INSTRUMENTS AND CONTROLS

**34—Flaw Detector.** Ultrasonic flaw detection is subject of 8-page bulletin (T200). Tells advantages of this compact, portable, high-performance instrument. Includes specifications, applications. *Branson Instruments, Inc.*

**35—Information Processing System.** Here's a 4-pager that sets forth key features of the GE225 system. Brochure CPB-101 explains

# Anyone can Claim to Meet the RLM Standards for Uniform Quality

# BUT

**unbiased proof of conformance can only be had through repetitive tests by an independent laboratory such as is guaranteed by manufacturers offering RLM-LABELED LIGHTING EQUIPMENT**

**When a buyer takes delivery on incandescent, fluorescent or mercury lighting equipment he has a right to expect that every fixture will meet his specifications in all respects.**

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**Here you have one reason why there can be no such thing as a "RLM type" fixture . . . Either *it is RLM* with its testing and certification programs to guarantee uniform quality and high standards . . . *or it is NOT RLM!***

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ETL Sphere Test used to determine overall efficiency of RLM incandescent lighting units.

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Please send free copy of the new "TWIN QQ" Pamphlet, the 1960 RLM SPECIFICATIONS BOOK and names of 22 leading manufacturers offering RLM-Labeled lighting equipment. (Please write name, company and address in margin below.)

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For more about these items, circle item numbers on Reader Service Card next to back cover.

equipment designed for wide variety of data-processing requirements. Photos. *General Electric Co.*

**36 — Temperature Controllers.** Booklet MC-185A (4 pages) describes Series 560 electronic indicating temperature controllers. The portable instruments cover range of −100 to 600 F. Thermistor probe specifications. *Fenwal Inc.*

**37—Recording Systems.** Bulletin No. 210 has 4 pages of information on systems for transmitting data to distant computer facilities via standard telephone circuits. Explains design features; shows typical layout. *Daystrom, Inc.*

**38—Rotameter Accessories.** Details and photos of fluid flow rate alarms for signaling or simple control functions are given in 4-pager (No. 175). Describes special features of magnetic and electronic alarms. *Brooks Rotameter Co.*

**39—Timers and Counters**. Catalog D-31 (30 pages) presents automation components and control systems. Includes applications, other data, for electronic and special timers, recorders, and the like. *Automatic Timing & Controls, Inc.*

**40—Thermocouples.** Hard-pack, small-diameter, mineral-insulated thermocouples are covered in 16-pager (G100-4). Contains guide to MegopaK bulk material, elements, and complete assemblies. *Minneapolis-Honeywell Regulator Co.*

## MAINTENANCE

**41—Hand Tools.** Catalog No. H-9 has 16 pages of information covering such hand tools as wrenches, pliers, cutters, screw drivers, punches, chisels, socket sets, extensions, tool chests, feeler gages, and others. *Owatonna Tool Co.*

**42—Cleaning Tools.** This 12-page bulletin (E-73) discusses completely interchangeable tools designed for

CORPORATE CHARACTER
*Founded on Understanding*

Armed with a thorough understanding of your painting problems, Wilbur & Williams has formulated a line of Specialized Protective Coatings the proven performance and reliability of which instill confidence wherever they are used. Formulated specifically to solve any painting problems you may encounter in plant, building, or equipment maintenance, Wilbur & Williams "protectioneered" finishes are fast-drying, easy to apply, durable and economical.

**TUF-QUIK** Heavy duty, fast-drying, rubber — alkyd — epoxy floor coating for concrete, wood or metal surfaces — inside or out. Chemical and solvent resistant. Available in high-gloss enamel or SKID-GRIP, anti skid finish for hazardous-footing areas.

Another MINIMUM — INTERRUPTION MAINTENANCE Product from . . .

THE WILBUR & WILLIAMS CO., INC.

*Factory and General Offices, 651 Pleasant St., Norwood, Mass.*

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# BUXTON EARNS 37% ANNUAL RETURN ON CARRIER AIR CONDITIONING INVESTMENT

Less absenteeism. Less labor turnover. Less spoilage. Higher morale.

If Carrier factory air conditioning provided only one or two of these benefits, it would be a good investment. But here is the eye-opening story of a manufacturer that is getting all of them — plus an increase in worker productivity so substantial that it is returning 37% on the investment!

The company is Buxton, Inc., leading maker of billfolds, key cases and other leather products, which installed Carrier air conditioning in its new 100,000 square foot plant in Agawam, Massachusetts back in 1957.

"Before air conditioning," says management, "we had to close down a number of afternoons each summer, losing thousands of man-hours during our busiest production season. Lost time was made up with expensive overtime and temporary, inefficient help. Even when we didn't close, production would drop 11 to 12% on really hot days."

After air conditioning? "Worker productivity has gone up 8.5% during four summer months," reports Buxton. "Our best judgment is that this represents an annual return of 37% on the investment — which does not include substantial gains from less absenteeism and labor turnover, less spoilage and higher morale."

Will factory air conditioning pay off for you? The coupon below will bring you a booklet that describes four important yardsticks. Write for this booklet today without obligation. You'll find it helpful. Carrier Air Conditioning Company, Syracuse, New York.

To Carrier Air Conditioning Company, Syracuse, N. Y. I am interested in receiving your booklet, "Will factory air conditioning pay off for me?"

Name_____

Company_____

Address_____

City_____ State_____



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# How BLACK LIGHT trapped the BURGLARS!

( A TRUE CASE HISTORY )

NEEDING ADDITIONAL WAREHOUSE SPACE, A LARGE EASTERN ELECTRICAL MANUFACTURING COMPANY LEASED FACILITIES NEAR ITS MAIN PLANT. IN SPITE OF PERIODIC CHECKS, VALUABLE EQUIPMENT DISAPPEARED REGULARLY FROM STORAGE AREAS AND LOADING DOCKS.

WHAT DO YOU MAKE OF IT, BILL? THIS IS THE FOURTH MISSING SHIPMENT IN A ROW!
LOOKS LIKE PROFESSIONALS, JIM—BUT I'VE GOT AN IDEA THAT MAY STOP THEM!

## Here's what Bill told the boss—

Kidde's new "black light" burglar alarm system provides tamper-proof photo-electric perimeter protection. Because it transmits a pulsating beam, it can't be jammed. And because it uses "black light," it can't be detected by thieves. The moment they break the beam, alarms sound. Best of all, this dependable Kidde protection is easy and inexpensive to install. Take a tip from Bill—find out more about Underwriters' Laboratories-approved "black light" protection. Write Kidde today.

**Kidde**

**Kidde Ultrasonic & Detection Alarms, Inc.**
**932 Brighton Road, Clifton, New Jersey**
A Subsidiary of Walter Kidde & Company, Inc., Belleville 9, N. J.


## FACTORY / CATALOG NEWS

*Begins on page 260*

For more about these items, circle item numbers on Reader Service Card next to back cover.

vacuum cleaning systems. Features include aluminum heads and wands, one-piece bodies, and steel swivels. *Lamson Corp.*

**43—Jacks and Pullers.** Here's a 16-pager (No. 60) with specifications and other details covering ratchet lowering, trip, journal, bridge, screw, push-and-pull jacks. It also lists special-purpose equipment. *Templeton, Kenly & Co.*

**44—Cleaners.** Three types of cleaners are described in 12-pager. Capacities of fireless steam and self-contained steam cleaners, and hydraulic pressure combination systems. *Malsbary Mfg. Co.*

**45—Lubricating Equipment.** How do you want to oil it? Answers are given in condensed Catalog X-135 (8 pages). Descriptions, specifications, and drawings are included in data on oil cups, dispensers, and the like. *Oil-Rite Corp.*

## PRODUCTION

**46—Milling Cutters, End Mills.** Here are two catalogs bound as one: No. 38C (40 pages) describes high-speed steel and carbide milling cutters. No. 38E (52 pages) has information on steel and carbide end mills. *Brown & Sharpe Mfg. Co.*

**47—Die Saver Switch.** Ways to solve problems of scrap losses, die damage, and machine repairs are discussed in Bulletin 27B (32 pages). Information on installation and set-up, sketches of simplified electrical circuit. *Robotron Corp.*

**48—Machinery Mounts.** This 6-pager (K3C) tells how to stop vibration, shock, and noise transmission by using steel spring machinery mountings. Eight case histories; tables of capacities, dimensions, weights. *The Korfund Co., Inc.*

**49—Rotoforming Machine.** Bulletin 500-P4 (8 pages) explains new economical method by which cold



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For more facts Circle 559 on Reader Service Card ➤

# This shop cuts costs by using STANICUT Oil 137 BCS

Machines seven metals, one plastic with this one cutting fluid

**Shank Manufacturing Company,** Chicago, cuts production costs three ways by using STANICUT Oil 137 BCS. (1) The 15 Warner & Swasey Lathes are never down for change of cutting fluid when the metal being worked is changed. There's no time lost with shutting down, cleaning up and changing oil. (2) There are no losses from the use of the wrong cutting fluid. (3) Floor space is used for productive machinery instead of being tied up as storage space for barrels of different cutting fluids.

**Titanium, brass, alloy steel,** aluminum and seven grades of Stainless plus Teflon plastic are all worked on the machines. Latest equipment, a reputation for good work, experienced operators and on-time delivery keep business coming to Shank. STANICUT Oil 137 BCS helps Shank hold down manufacturing costs.

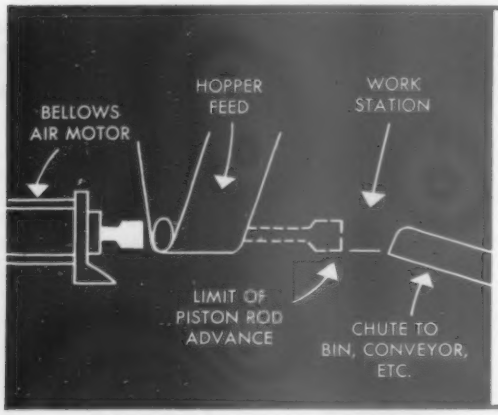
Does cutting costs with a cutting fluid interest you? Let one of Standard Oil's experienced lubrication specialists show you how STANICUT Oil 137 BCS can do it. Call the Standard Oil office nearest you in any of the 15 Midwest or Rocky Mountain states. Or write **Standard Oil Company (Indiana), 910 South Michigan Avenue, Chicago 80, Illinois.**

*You expect more from* **STANDARD** *and you get it!*

Frank Kruppe, Shank president (left) shows Hank Krueger of Standard Oil one of the pieces Shank Mfg. produces. Hank Krueger provides Shank plant with technical service on cutting fluids. Hank has the experience for this work. He's been doing it for six years. He has an engineering degree from Illinois Institute of Technology and has completed Standard's Sales Engineering School.

# ONE OF THESE INEXPENSIVE, SHOP-BUILT WORKFEEDERS CAN SAVE YOU HUNDREDS OF DOLLARS

Shown here are three ways you can use Bellows Air Motors® to feed and position workpieces more quickly, efficiently and at lower cost. They are typical of the many ways Bellows Air Motors are used in all types of industries.

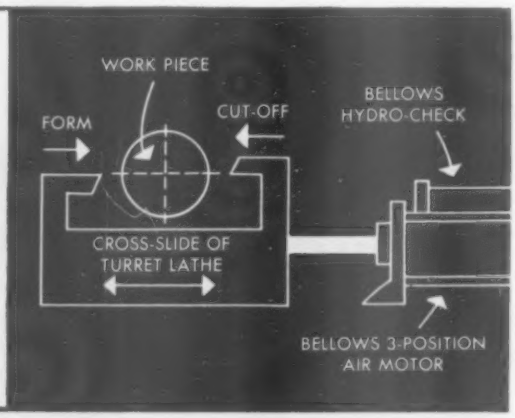


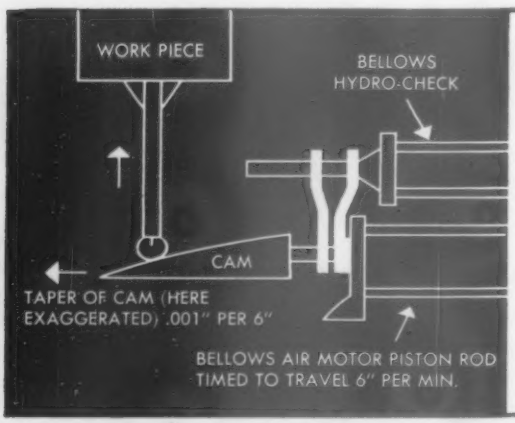

## HORIZONTAL, STRAIGHT-LINE POSITIONING AND EJECTING

This extremely simple set-up is widely used in conjunction with hopper feeds in stamping and coining, sawing, drilling, deburring, inspection and similar operations. On its advance stroke, the piston rod of The Bellows Air Motor takes a workpiece from the hopper and moves it until, at full advance, the piece is properly positioned for the operation. The positioning of each workpiece serves to eject the preceding unit. Speed of advance and retract strokes is individually adjustable. The Air Motor can be set for either single cycle or continuous operation, and, when desired, is easily synchronized with a machine element.

## FEEDING CROSS-SLIDE OF TURRET LATHE

The sketch at right shows a typical application of a Bellows 3-position Air Motor feeding the cross-slide of a turret lathe. Center, or "neutral," position of Air Motor piston rod is tool "at rest" position. Rod retracts to "form," advances to "cut-off." Using sequencing switches, the Air Motor's operation can be synchronized with the automatic turret to "form" at any point in turret's sequence, return to neutral until all other operations have been performed, then to advance to "cut-off." Speed of advance and retract strokes is independently adjustable. Incorporation of a Bellows Hydro-Check® provides accurate control of piston rod, complete freedom from "chatter."





WORK PIECE
BELLOWS HYDRO-CHECK
CAM
TAPER OF CAM (HERE EXAGGERATED) .001" PER 6"
BELLOWS AIR MOTOR PISTON ROD TIMED TO TRAVEL 6" PER MIN.

## SLOW, ACCURATE FEED RATE

Slow and/or highly accurate feed rates—such as might be required by certain grinding and cut-off operations—can be achieved by advancing the work-holding fixture by the action of a roller moving on a tapered cam which is mounted on an Air Motor's piston rod. As shown in the sketch at left, for example, the cam has a taper (greatly exaggerated in the illustration) of .001" per 6" length. If the piston rod is timed to travel 6" per minute, the resulting feed rate of the workpiece is .001" per minute. Compound feed rates can be obtained by appropriate variations in the contour of the cam. Perfect smoothness and accurate control of Air Motor's piston rod is assured by use of a Bellows Hydro-Check.

807-C

***THIS SPOT-A-MATION IDEA FILE IS YOURS ON REQUEST***

Contains information on a variety of different parts feeders, as well as installation data, wiring diagrams and equipment lists for scores of other "Controlled-Air-Power" applications. Write for your free file . . . today! Address Dept. FA-960, Bellows-Valvair, Akron 9, Ohio.

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CONTROLLED-AIR-POWER DEVICES FOR FASTER-SAFER-BETTER PRODUCTION

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*The Bellows Co. • Valvair Corp. Akron 9, Ohio*

DIVISIONS OF INTERNATIONAL BASIC ECONOMY CORPORATION (IBEC)



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metal is pressure-shaped into needed thicknesses and circular shapes. Includes range of sizes. *Commercial Shearing & Stamping Co.*

**50—Beam Welding Process.** Advantages of the electron process and the equipment it requires are set forth in this 12-page catalog (ADC-937). Shows a schematic drawing of the electric beam gun; other details. *Air Reduction Sales Co.*

**51—Saws.** Here's a convenient 34-page handbook on the selection and use of hack saw and band saw blades for cutting ferrous and non-ferrous metals, hard plastics, and rubber. Has useful subject index and photos. *Nicholson File Co.*

**52—Infra-Red Ovens.** Bulletin BRG100 has 8 pages of information on infra-red heating equipment. Includes details on components, modular oven sections, and a group of oven units for various operations. Diagrams, charts. *Radcor, Inc.*

**53—Height Gage.** This informative booklet (No. 1-6001, 4 pages) describes portable, self-contained, quick-change, multi-purpose gage. Also lists accessories. *United States Chemical Milling Corp.*

**54—Chip-Handling System.** Book No. 2926 (12 pages) outlines systems for automatic, continuous crushing and de-oiling of metal chips and turnings. Includes application photos and system-arrangement diagrams. *Link-Belt Co.*

## MATERIAL HANDLING

**55—Lift Trucks.** "First in Imagination—First With Reality" is a 12-pager (No. 2001) that discusses material-handling operations in the future. Tells how company designs and develops "tomorrow's" trucks. *Automatic Transportation Co.*

**56—Steel Shelving.** T-line and angle shelving, tool storage inserts, bin units, and truck shelving are

You never forget weekly, semi-monthly or monthly lubrication and inspection when Acme Visible is on guard. Maintenance, repair and parts records for each machine are a unit. Therefore all pertinent facts are together. And each unit carries colored signals that flag your eye when it's time to act. Result, far less down time. More production. Send for facts.

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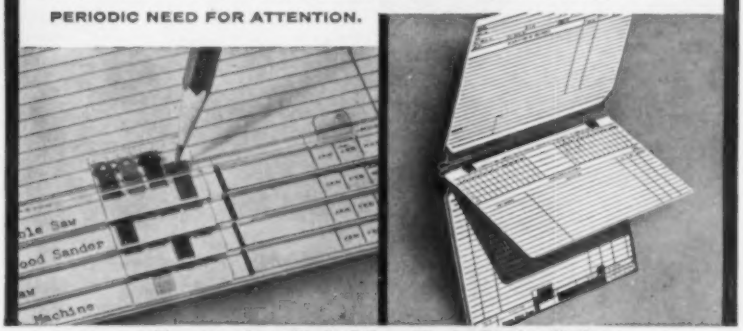

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if you spend more than $100 per week for paint or other coatings, you should *find out about...*

NORDSON HOT AIRLESS SPRAY PAINTING

The Nordson Hot Airless System can save you up to 30% on paint or other coating materials and on labor too! Less expensive spray booths and exhaust systems are needed. Clean up and housekeeping costs are reduced and at the same time finishing quality is improved.

Find out how Nordson Hot Airless can pay off for you, in savings and in improved quality. Write today!

NORDSON CORPORATION
37 Jackson St., Amherst, Ohio

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# "Foreman's Helper"

CAN PAY FOR ITSELF IN A MONTH OR LESS!

Servis Recorder Model M operates electrically, can be installed in foreman's office.

*Makes a Record of*

**PRODUCTION TIME & DOWN TIME**

*of any machine*

This device is called the SERVIS RECORDER. It gives you a precise work record of any machine. If a machine is idle the Servis Recorder reports exactly when and how long the delay lasted. Records are permanent, easy to read, easy to file. They enable you to improve scheduling, determine the cause of down time, and help you set rates.

Mechanical models which attach to machines, lift trucks or vehicles are also available.

WRITE TODAY!

Full information will be mailed to you at once.

**THE SERVICE RECORDER COMPANY**

1013C Rockwell Ave., Cleveland 14, Ohio


## FACTORY / CATALOG NEWS

*Begins on page 260*

For more about these items, circle item numbers on Reader Service Card next to back cover.

presented in Catalog No. 2400 (36 pages). Gives specifications, quality control procedures, capacities. *Alan Wood Steel Co.*

**57—Strapping Tools.** Catalog SPD-238 (4 pages) contains specification chart that lists applications for four electric-powered and eight air-powered tools. Also covers suspension brackets and hooks. *Signode Steel Strapping Co.*

**58—Wire Rope.** Whatever the need, this comprehensive 156-page catalog (No. 493) should have the answer. Contains basic wire rope information, details of performance on equipment such as hoists, cranes, drivers. *Bethlehem Steel Co.*

**59—Hoists, Trolleys, Cranes.** Bulletin DH-28A has 8 pages of data on motor-operated hoists with 300- to 20,000-lb. capacities, lightweight hand hoists, and three types of cranes. Gives weights, dimensions. *American Chain & Cable Co., Inc.*

**60—Storage Racks.** Here's a 28-pager titled "The Storage Rack Story." Discusses today's storage needs, high cost of damaged materials and products, design of engineered racks and advantages for handling operations. *Paltier Corp.*

**61—Cartoning.** Latest in automatic cartoning equipment is described in 6-pager. Machinery is portable and simple to operate. Covers adaptations, accessories, and special combinations. *Bivans Corp.*

**62—Trucks.** Here's a "library" of information to help you decide how much it costs to operate various types of trucks. Two 16-pagers are cost studies, and a 20-pager covers battery-electric trucks. *The Electric Storage Battery Co.*

**63—Triplex Masts.** Bulletin 2410A (6 pages) covers triplex masts for gasoline-powered and electric lift trucks. For low ceilings and doorways, as well as high stacking jobs. *The Yale & Towne Mfg. Co.*


## *An Announcement to Safety Engineers and Plant Managers*

In the wide range of medical emergencies which occur in industry, immediate oxygen may well be vital. Two of the three leading causes of accidental death are reversible with oxygen.

The manufacturers of Metrox, pioneers in the field of portable oxygen, are now marketing emergency units (56 liters and 305 liters) engineered to meet the exacting demands of physicians to whom a dependable supply of emergency oxygen is important.

The Metrox unit is a precision instrument designed to do just one thing: Deliver a constant flow of oxygen, at a rate you set, with maximum safeguards against rebreathing.

It is highly portable, completely dependable and inexpensive.

Those responsible in industry may now insist on these features in any portable unit.

- A constant flow which does not diminish with lowered tank pressure.
- A flow which can be regulated, from three to twelve liters per minute.
- Mask valves which minimize carbon dioxide build-up.

Developed for physicians, from criteria set by physicians, the new Metrox invites comparison.

Both the 56 liter and 305 liter units are in carrying cases. Both are equipped with adaptors for quick, easy refill, and both are furnished with the latest in safety mask design.

METROX

*4335 GOVERNOR PRINTZ BLVD.*
*WILMINGTON 2, DELAWARE*
*144 TITLEY AVENUE*
*PASADENA, CALIFORNIA*

# The reason it makes management sense to specify Urethane coatings

Based on a study* of more than half the manufacturing corporations in the U. S., the total annual cost of maintenance for all plants is $14 billion a year. This is equivalent to all of the dividends paid by business in 1959. It is equal to 2/3 of the total annual net profit of all manufacturing industries.

This kind of business environment demands top management attention at the materials specifying level, particularly where maintenance cost control is involved. Materials are available today which make every past rule of thumb obsolete and requires a new appraisal to bring costs more accurately in line with service and function rendered.

Urethane coatings are one of these new materials, designed specifically to meet the challenge of bringing this phase of maintenance cost back into line by extending the service life and quality of protection provided. The old bid-price method of coatings selection, based on initial cost per gallon, may be one of the reasons more of your net sales dollar is going down the maintenance drain than into the profit till.

If you look at the paint on your plant as an investment in time and labor as well as money, we have some facts about urethane coatings that will interest you.

*Source of this study available on request.*

**MOBAY CHEMICAL COMPANY**
Dept. F-4 Pittsburgh 5, Pennsylvania

Mobay is the only domestic supplier of all the basic chemicals required to formulate the various urethane coatings systems, and developed the original technology of urethanes in the United States.
o-3

MOBAY
First in Urethane Chemistry

# NEW COMPACTNESS

# NEW SAFETY

# NEW EASE OF ACCESS

## NEW STORED ENERGY

*This is the all-new I-T-E type HK metal-clad switchgear*

**Roomy interior for easy access.** Only I-T-E gives you a separate 30-in.-high instrument compartment, completely isolated from the high-voltage compartment. And it's closer to the floor, so you can reach into it easily. Put your elbows in and work in comfort. High visibility white interiors simplify installation and trouble shooting. Your control wiring can easily enter from the bottom or through the top sheet.

**Free detailed bulletin—new strip film.** Get the whole story about *all* the new advances in this I-T-E metal-clad switchgear. Learn about its easier operation, greater safety, and superior protection. Send for Bulletin 2801-2A. And ask also to see the new sound strip film. Can be shown to you singly or to your group. Contact your nearby I-T-E sales office or write I-T-E Circuit Breaker Company, Dept. SW, 1900 Hamilton St., Philadelphia 30, Pa.

**Fits where others won't.** This is a 4160 volt switchboard. See how low and shallow it is compared with old standards. It's only 80 in. high and 58 in. deep. So it saves both floor space and overhead space. Goes easily under low ceilings. Fits in narrower aisles. And its reduced height puts all instruments at easy-to-read eye level. Roomy cable compartments at the rear are accessible through hinged doors. All insulation in the switchboard and circuit breakers is flame-retardant and track-resistant.

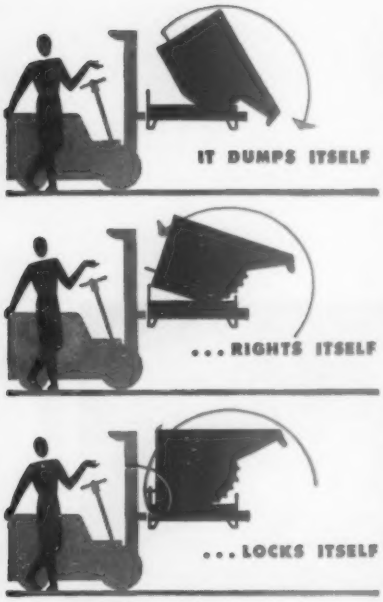
**Closed-door drawout.** The door stays closed while the breaker is moved from connected . . . through test position . . . to disconnected and back. There's always solid steel at ground potential between the operator and the live parts of the gear. Even an inexperienced man is completely safe. Since doors stay closed, aisles need never be cluttered. And foreign matter can't get into breaker compartments.

**Stored energy closing.** This is not simply a new feature added to an old design. It is integrated into a completely new circuit breaker design. Gives you fast, uniform closing every time. Prolongs contact life. And you can close the circuit breakers even without control power. For greater economy, the spring charging motor draws only one-tenth the current of previous methods.

**Easy-to-change current transformers.** They're accessible from the front. You don't need to disturb your cable connections at all. Just remove the shutter barrier assembly over the primary studs, and there they are. As this view shows, you can locate current transformers on both load and line sides of the circuit breaker, providing more flexibility in relaying.

**Compact 4160 volt circuit breaker.** Low center of gravity permits easy, safe, one-man maintenance. High-strength, flame-retardant track-resistant moldings eliminate need for structural metal above the base frame. Provides insulation strength where needed most. Arc chutes tilt for easy inspection. Lift off without tools. Modern materials and new design result in substantial reduction in circuit breaker size.

**I-T-E CIRCUIT BREAKER COMPANY**




**This hopper and your truck can cut handling costs 50%**

It's a self-dumping hopper made for fast, efficient handling of wet or dry, hot or cold bulk materials:

Scrap Metal . . . Cinders
Cullet . . . Hot Forgings
Punch Press Parts
Soybean Meal . . . Pickles

Hundreds of industries use thousands of them. Pick-up is swift and simple. Forks or platform of any standard lift truck slide easily into hopper underframe. Truck operator picks up loaded hopper . . . transports it to its destination . . . trips the latch . . . and the Roura does the rest . . . automatically.

They're strong . . . husky . . . made of 3/16" steel plate with continuous arc-welded seams. Heavier plate if desired, also stainless steel or galvanized. Made in eight sizes, 1/3 to 4 yard capacities, with live skids or a choice of wheels.

Standard models are available for immediate shipment from stock.

**ROURA**
*Self-Dumping*
**HOPPER**

**WANT MORE DETAILS** on how you can save money with Roura? Just clip this coupon . . . attach it to your letterhead . . . sign your name . . . and mail to

**ROURA IRON WORKS, INC.**
1423 Woodland Ave., Detroit 11, Michigan

# FACTORY BOOKS

## Psychology for the businessman

Here's one of those really effective books you continually watch for, but find only a couple of times a year—if you're lucky. In *People, Problems and Profits,* Saul Gellerman covers a weighty subject—the uses of psychology in management. Yet the book is highly readable because the author writes naturally, is succinct and lucid.

Gellerman holds your interest, not because he's particularly provocative, but because he makes a difficult subject appear simple. He's at once sympathetic and critical. He presents many viewpoints without prejudice so that the reader may grasp the best of each. He's to the point and helpful.

The thesis here is that psychology is a limited but very useful technique. Gellerman believes businessmen, especially, have sought more help from it than it offers. But he goes on to show how psychological information may be used to supplement and reinforce other scientific and intuitive methods.

The book offers the executive a knowledge of modern psychological concepts so he can deal with industrial and business psychologists, and effectively apply their ideas and techniques. It draws upon actual management situations, and uses terms familiar to the businessman. It concentrates on ideas and methods currently followed in the personnel guidance field, and covers today's practices in personnel evaluation and the psychology of work itself.

Among the topics treated are the psychology of using psychology, the "company" personality, how psychologists work, face-to-face management, and a philosophy of mature management.

In the last chapter, Gellerman makes a perceptive statement of the place of psychology in management. Psychology, he says, isn't some kind of magic elixir that will purge management of all its ills and ailments. Rather, "In the last analysis, despite all the aid and comfort that psychology and all the other consulting services can bring, management will still have to provide its own salvation." (Reviewed by L. R. Bittel.)

*People, Problems and Profits, by Saul W. Gellerman. McGraw-Hill Book Co., Inc., 330 W. 42nd St., New York 36. 254 pages. $5.95.*

## What about the technician shortage?

This report to industry was written by eight Harvard Business School graduates. The tables, summaries, bibliography, and other information in *Managing Technician Manpower* are well organized, especially for readers who may want to quote parts of the book in their labor relations work.

The engineer shortage and the role of the technician who feels he is frozen into a niche are discussed authoritatively. The subjects covered include: technical institutes, how industry can help educators, women as technicians, compensation ranges, collective bargaining.

*Managing Technician Manpower. Technician Manpower Associates, Box 158, Scarsdale, N. Y. 172 pages. $18.50.*

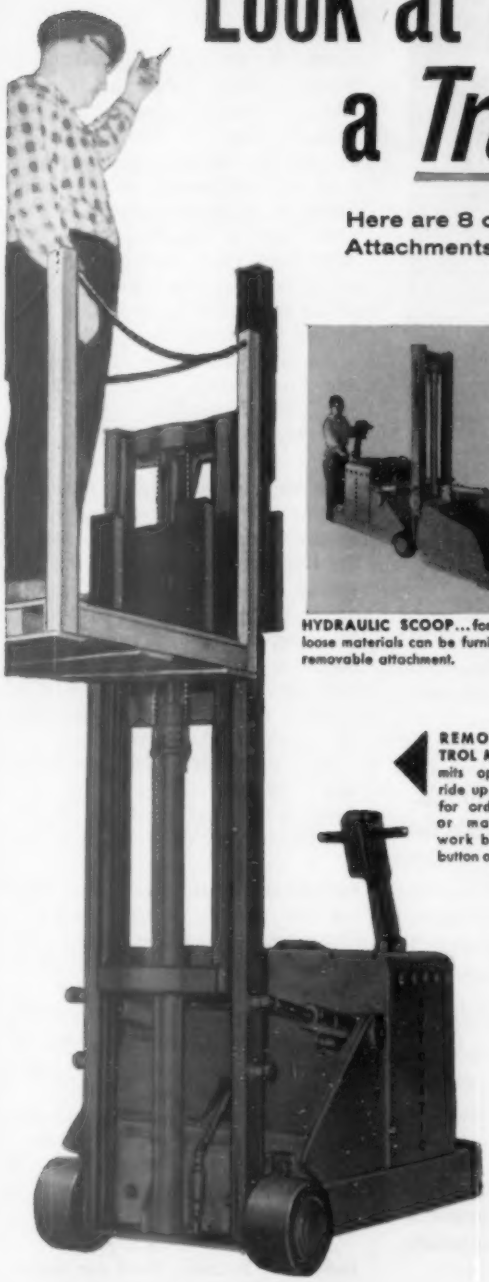
## The maintenance Show revisited

Like its predecessors, Volume XI of the *Techniques of Plant Maintenance and Engineering* contains all the 33 prepared papers presented at the 11th Annual Plant Maintenance & Engineering Conference held in Philadelphia late in January. It also includes transcripts of the question-and-answer sessions that followed the papers, and reports of round-table talks in 10 industry groups.

This is "must reading" for any maintenance manager or plant engineer who wants to keep informed on the latest and best develop-

# Look at all-these things a *Transporter* can do!

**Here are 8 cost-cutting ways Automatic's Standard Attachments can turn Transporters into Specialists**



These specially designed standard attachments can add job flexibility to your Transporter Stacker. Now, a variety of jobs can be performed at considerable cost savings.

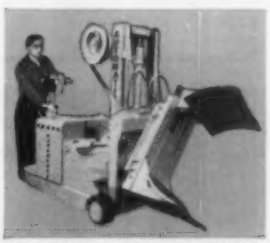
**HYDRAULIC SCOOP**...for handling loose materials can be furnished as a removable attachment.

**REMOTE CONTROL MAST** permits operator to ride up and down for order picking or maintenance work by pushing button on carriage.

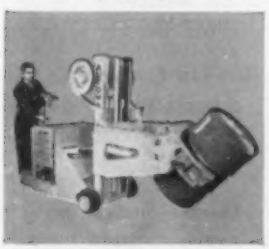
**UTILITY CLAMPING DEVICE**...Clamp arms can be attached to forks for handling cartons, etc. Clamp arms can be removed to handle pallets.

**MECHANICAL GRAVITY DRUM DUMPER**...Removable attachment to fit on forks.

**GOOSENECK CRANE ATTACHMENT**...for items too bulky or too irregular in shape to be palletized.



**REVOLVING PAPER ROLL CLAMP** ...handles rolls vertically or horizontally...revolves 360° right or left.



**HYDRAULIC DRUM HANDLER**... picks up and carries any standard drum ...180° controlled forward dumping.

**CABLE REEL HANDLER**...lifts and transports wire and cable reels.

***First in Imagination...***

***First with Reality***

**AUTOMATIC®**

**AUTOMATIC TRANSPORTATION COMPANY**
Division of the Yale & Towne Manufacturing Company
39 West 87th Street, Dept. PO, Chicago 20, Illinois

**MAIL COUPON TODAY**

Please mail me the data indicated below

- ☐ "Transporter Facts and Factors"
- ☐ Descriptive literature on special attachment for the following type of work.....

.....

NAME_____ TITLE_____

FIRM_____

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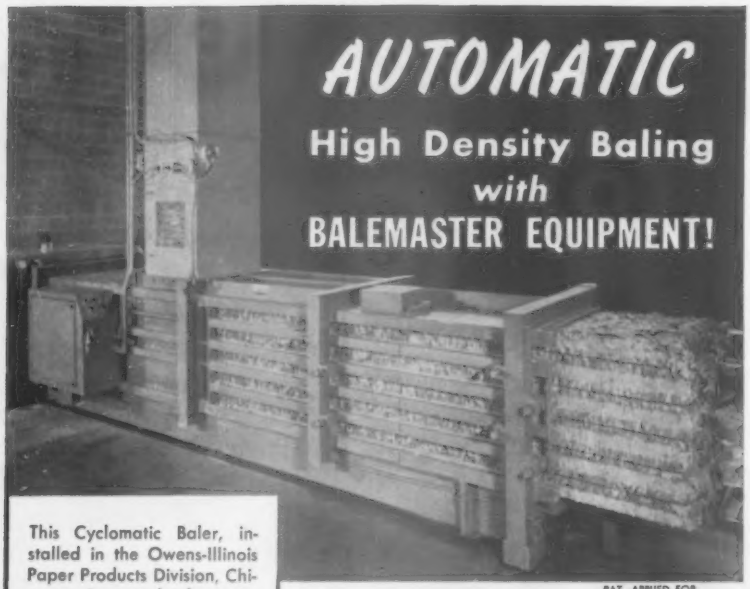
CITY & ZONE_____ STATE_____



For more facts Circle 568 on Reader Service Card




This Cyclomatic Baler, installed in the Owens-Illinois Paper Products Division, Chicago, is completely automatic. It is fed by the Cyclomatic Pneumatic Conveying System which picks up scrap from the entire plant. A Cyclomatic Hogger, not shown, reduces the larger pieces of scrap to a size suitable for air conveying and efficient baling.

PAT. APPLIED FOR

PAT. APPLIED FOR

One of many Cyclomatic pick-up stations in the Owens-Illinois Paper Products Division Plant. Scrap is quickly and automatically conveyed to the Cyclomatic Baler at a rate of 100 pounds per minute through each pick-up station.

√ If you have a pneumatic-conveying system now all you need is CYCLOMATIC® BALING EQUIPMENT . . specifically designed to provide you with a modern efficient baling system with plenty of reserve power to meet all your requirements.

√ If you do not use pneumatic-conveying or if your present system is not adequate to properly prepare materials for automatic baling, Balemaster can design and furnish a modern, efficient pneumatic-conveying system for your plant . . . or Balemaster can design and install the complete Cyclomatic System for *automatically handling and baling scrap.*

√ The Cyclomatic System is completely automatic—no manual handling of scrap from the point of generation to the finished bale.

***For the one company that designs, engineers, manufactures and can install a complete integrated system for your needs — depend on Balemaster.***

***CYCLOMATIC* Means Automatic Scrap Material Handling and Baling.**

*Write today for full information*

Balemaster™ DIVISION OF
EAST CHICAGO MACHINE TOOL CORPORATION
4801 Railroad Ave. • East Chicago, Indiana • Phone: EXport 7-7470




ments in his profession—for example, work sampling, stores control, planning and scheduling, training, use of data processing equipment, maintenance performance evaluation—all in some 340 pages of maintenance-management know-how. If you didn't attend the conference, this is the next best thing. In fact, you can now attend *all* the sessions at your leisure. (Reviewed by Carl G. Wyder.)

*Techniques of Plant Maintenance and Engineering. Clapp & Poliak, Inc., 341 Madison Ave., New York 17. 341 pages. $10.*

**New Methods of Heating Buildings** contains the six papers presented at a recent conference conducted by the Building Research Institute. Of special interest to plant and maintenance engineers, the papers cover these topics: energy and fuels for future heating and power systems; new air heating methods; hydronic heating; radiant systems; new electric systems; solar heating.

*New Methods of Heating Buildings. Building Research Institute, 2101 Constitution Ave. N. W., Washington, D. C. 138 pages. $5.*

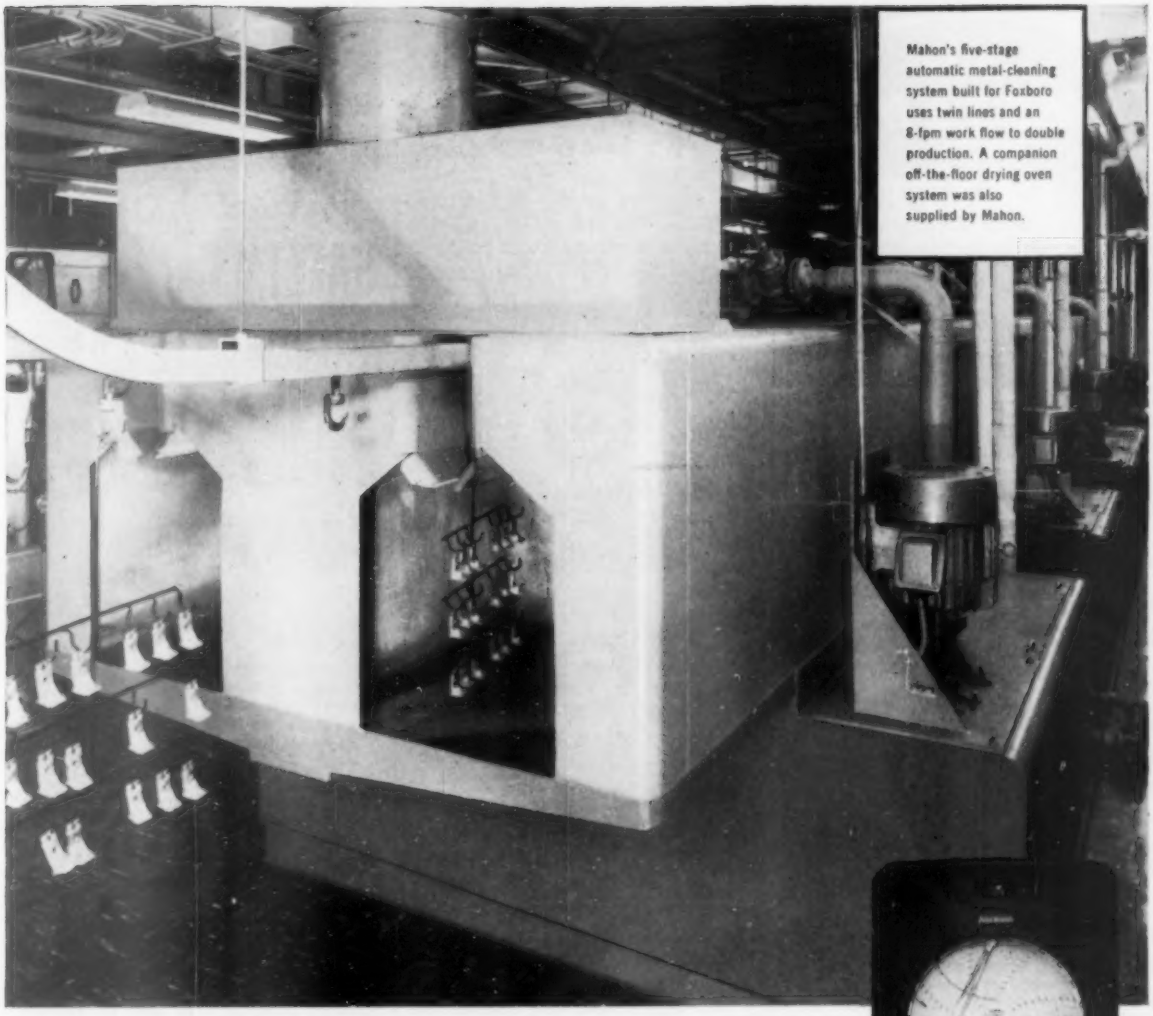
**Industrial Accident Prevention Signs** are the subject of this American Standards Association code, number Z 35.1 - 1959. In addition to the specifications, there are appendixes covering sign construction, materials and finishes, and maintenance. This booklet will be useful in almost every plant.

*ASA Specification for Industrial Accident Prevention Signs. American Standards Association, Inc., 10 E. 40th St., New York 16. 20 pages. $1.35.*

**Industrial Estates: Tool for Industrialization** examines the industrial estate as a method for developing small and medium-size industry. Descriptions of industrial parks in other countries should interest all concerned with the planned development of industry.

*Industrial Estates: Tool for Industrialization, by William Bredo. The Free Press, 119 W. Lake St., Chicago 1. 240 pages. $6.*


For more facts Circle 569 on Reader Service Card



Mahon's five-stage automatic metal-cleaning system built for Foxboro uses twin lines and an 8-fpm work flow to double production. A companion off-the-floor drying oven system was also supplied by Mahon.

# FOXBORO FINISHES INSTRUMENT CASES...AND 20,000 OTHER PARTS AS WELL...WITH MAHON EQUIPMENT

The Foxboro Company of Foxboro, Mass. is meeting the stepped-up industrial need for control and measuring instruments. Two new Mahon Finishing Systems and other allied equipment were recently installed to help solve Foxboro's accelerated production problems for these high-quality, high-precision products. The result: an automatic metal-cleaning process, flexible enough to handle some 20,000 parts—efficient enough to double capacity; and a space-conserving off-the-floor drying-oven system that integrates all priming and finish painting. The Mahon-engineered and built equipment not only met new production requirements under improved working conditions but also offered color flexibility (six of more than 150 colors can be run at one time).

Improved finishing is probably the *easiest . . . and most economical . . . product improvement* you can make. Call in a Mahon engineer and get the facts on what Mahon can do for your product . . . your costs.

*WRITE FOR MAHON CATALOG A-660*
*ALSO IN SWEET'S P. E. FILE*

YOUR BIGGEST VALUE IS IN MAHON'S PLANNING & ENGINEERING EXPERIENCE

**THE R. C. MAHON COMPANY**
*DETROIT 34, MICHIGAN*
MANUFACTURING PLANTS—Detroit, Michigan and Torrance, California
SALES-ENGINEERING OFFICES—Detroit, New York, Chicago, San Francisco and Torrance.

**MAHON**

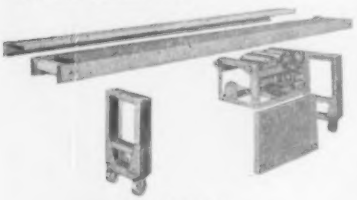


**For more facts Circle 570 on Reader Service Card**

FOR THE
SYSTEMS
OF THE
SIXTIES

CONVEYORS THAT COST LESS TO INSTALL

Standardized unit design that makes it easy to assemble your own systems and alter them at low cost when your requirements change. This is the *original* Unibilt idea.



UNITABLE®
Build-It-Yourself Construction

CONVEYORS THAT COST LESS TO OPERATE AND MAINTAIN

Highest quality materials and components designed and selected to *work together*. The staff at Conveyor Specialty Company has over 35 years' experience in engineering conveyors and systems.

UNIBILT®
Series E Belt Conveyor

UNIBILT® Conveyor system

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CONVEYOR SPECIALTY CO.
INCORPORATED
*Distributors in Principal Cities*

32 Newport Avenue, North Quincy, Mass.

## FACTORY FILMS

**Profile of a New Concept** demonstrates use of 2000- to 5000-lb.-capacity gas-powered fork trucks. Illustrates fast fork-lift speeds; points out how long wheel base and proper weight distribution contribute to maneuverability and driver comfort. Shows other operating features, such as automatic transmission, etc. Slide film, sound, color, 20 min. For loan, write to:

*Clark Equipment Co., Industrial Truck Div., Battle Creek, Mich.*

**Specialty Steels** dramatizes the production of special-purpose steels such as stainless, as well as toughwear, shock-resistant steels for the toolroom. Explains the science and art that go into the manufacture of steel. Scenes were taken in two different plants. 16mm, color, 45 min. Write to:

*Crucible Steel Co. of America, Dept. TA-4, P. O. Box 2518, Pittsburgh 30, Pa.*

**Grease—the Magic Film** tells the story of lubricating grease and how the "magic" substance makes modern mechanical progress possible. Film shows the research and testing that's done to insure a constantly better product. 16mm, sound, color, 25 min. Write to:

*National Lubricating Grease Institute, 4638 J. C. Nichols Pkwy., Kansas City 12, Mo.*

**A Letter to Moscow** portrays the strength of this country's economic system of free enterprise, and traces the growth of an America company to show how it is able to develop and prosper under the competitive system. Filmed in answer to the challenges made by Soviet Premier Nikita Krushchev when he visited the U. S. in 1959. 16mm, color, 28 min. For loan, write to:

*Armstrong Cork Co., Liberty and Mary Sts., Lancaster, Pa.*

**Pocket Guide to Free Films** lists 18 16mm sound films covering various subjects in the chemical field. Gives brief descriptions. For free copy, write to:

*E. I. duPont de Nemours & Co., Audio Visual Services, Wilmington 98, Del.*

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*...America's greatest name in*
SAFETY CANS *and*
OILY WASTE CANS

"JUSTRITE" on a safety can or oily waste can is positive assurance of protection. Millions of these carefully designed and engineered cans are in use in thousands of plants all over the United States. Reduce fire hazards due to benzine, oily rags and waste. JUSTRITE Safety Cans are the finest cans for use for flammable or highly volatile liquids. Both types of JUSTRITE cans are Underwriters' Laboratories and insurance companies' approved.

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# New All-Electric Hypressure Jenny!

Anywhere that flame, fumes, or excess water are objectionable or hazardous, the new Model E-350 All-Electric Jenny® will solve the cleaning or sanitizing problem. And with the new Jenolizing Process, machinery, equipment, and parts are left with a coating that protects against flash rusting, and gives a glossy, like-new appearance to painted surfaces.

Model E-350 combines the right amounts of heat, pressure, and cleaning solution to handle the majority of cleaning jobs at savings of up to 80% in time and labor costs. Its compact size, portability, low water output, and quiet operation without flame, smoke, or fuel fumes, make it ideal for use practically anywhere in the plant.

Send the coupon today for complete information. You'll welcome the outstanding performance of E-350—and the attractive plan which permits you to prove to yourself the economies of this new All-Electric Jenny.

**Perfect for**

manufacturing plants, food processors, textile mills, chemical and pharmaceutical plants, metal working and fabricating, petroleum industry, canneries, hotels and institutions, and every other operation where fumes, smoke, excess water are objectionable.

**Mail Today!**

8.

Please send complete information on new E-350 All-Electric Jenny and Jenolizing.

Name ..... Title .....

Company .....

Address .....

City ..... Zone ..... State .....

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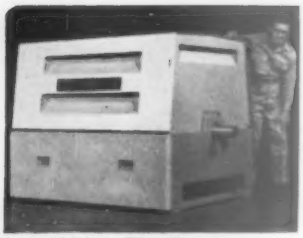
**HOMESTEAD VALVE MANUFACTURING COMPANY**

Hypressure Jenny Division, P. O. Box 85, Coraopolis, Pa.



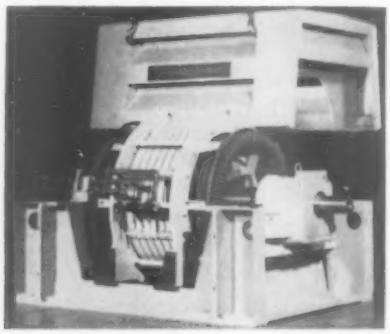
**More Value For Your Large Motor Investment . . .**

# Westinghouse F/A design significantly

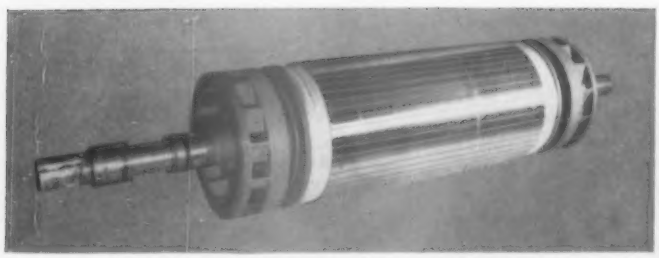
Because of their inherent design (see features below), F/A Motors greatly reduce nerve-jarring, fatiguing, high-speed large-motor noise in your plant or powerhouse . . . paying off in better working conditions and higher employe efficiency and morale.

It has been proved that quieter working environments tend to increase productivity per dollar of operating expense. Under rigid tests, Westinghouse F/A Motors show a truly significant reduction in noise levels over conventional large motors. Considering this, plus the many other F/A bonus values, you can readily see why you get more total value for your large motor investment with Westinghouse.

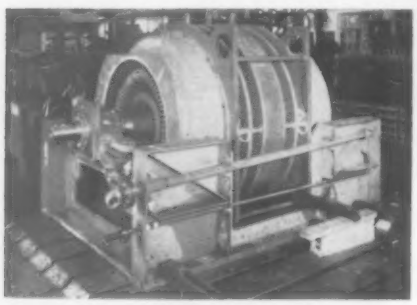
**Other F/A bonus values**—Besides quiet operation, the Westinghouse F/A Motor gives



**All enclosure parts** are supported by the motor base, not from the frame or rotor where noise and vibration originate.



**Spun aluminum shields** cover the rotor cage winding ends, eliminating the siren-like whine caused by air rushing between the bars.



**Heavy, massive, two-pole stator assembly** minimizes low frequency noise.

OCTAVE BAND NOISE LEVELS IN DECIBELS

| FREQ CPS | ALL | 20-75 | 75-150 |
|---|---|---|---|
| PRE-F/A | 95 | 85 | 87 |
| F/A | 82 | 74 | 71 |
| ATTENUATION | 13 | 11 | 16 |

**Less noise:** This chart shows clearly the reduction in noise output typical of the results obtained by hundreds of tests of the F/A design, as compared to previous designs. The entire range of cycles per second, and their attendant decibel readings shown here, prove this superiority of the F/A design.

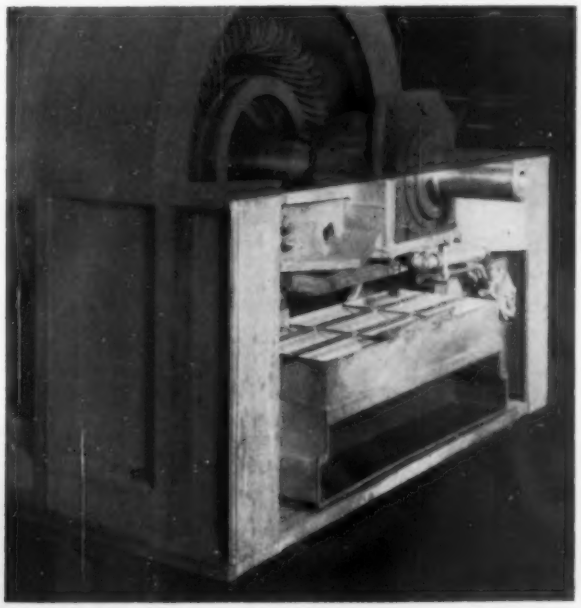
# reduces motor noise in all sizes and speeds

you more value for your large motor investment with these cost-saving advantages:

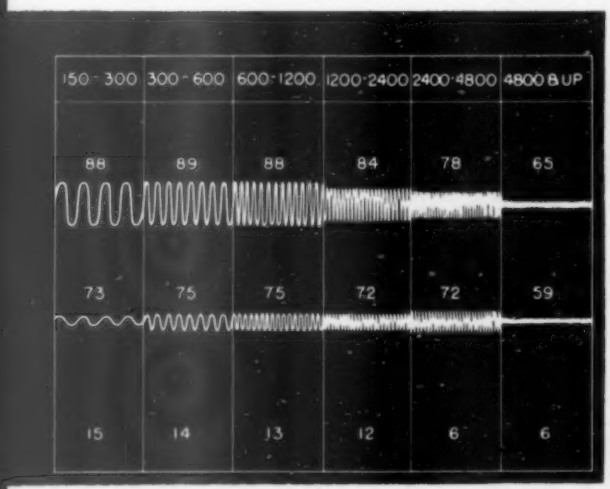
**Super reliability**—Thermalastic® insulation withstands the stresses which cause ordinary insulations to fail. F/A Motors have the time-proved stator, rotor and bearings which have set records for long, trouble-free service life.

**Low maintenance**—The F/A Motor housing design makes inspection easy and fast. Maintenance is now a matter of minutes. Costs in time and man power have been lowered as much as 75%.

There's a Westinghouse F/A Motor to fill all your large motor needs. For more information, call your Westinghouse representative, or write Westinghouse Electric Corporation, P.O. Box 868, Pittsburgh 30, Pennsylvania. You can be sure . . . if it's Westinghouse. J-15019



**Noise mufflers,** above, can be easily and economically applied to air openings, even after the F/A Motor is on the line. These mufflers have little air resistance, high noise attenuation, and require practically no maintenance.




**Special design**—smooth surfaces plus carefully directed air flow and favorable air passages—lowers noise levels.

Westinghouse

# LOCATE YOUR NEW SUPPLIERS

THROUGH THE FACILITIES REGISTER...

**ASK THE MAN FROM THE NORTHERN PLAINS**

to put you in direct contact with the manufacturers whose wide variety of production is available to you. An accurate plant by plant, machine by machine study has been made and electronically tabulated by Northern Natural Gas Company and other natural gas utilities serving the 5 Northern Plains States. Qualified producers are being referred to industry quickly and without obligation.

To utilize this service write Randall Klemme, Vice Pres., Northern Natural Gas Company, Omaha 1, Nebr., or call Webster 7600.

***This Unique Service Is Yours ... Simply For The Asking***

*Serving the Northern Plains*
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*General Offices: Omaha, Nebraska*


# ADVERTISERS' LITERATURE

**Offered in ads received up to 5th of last month. To get items you want, circle numbers on Reader Service Card next to back cover.**

## ELECTRICAL

**275—Switchgear.** Bulletin 2801-2A tells complete story of metal-clad switchgear. I-T-E Circuit Breaker Co.

**276—Cable.** Illustrated brochure on insulated cable with corrugated metallic sheath. Simplex Wire & Cable Co.

**277—Fuses.** Bulletin LPCS on low peak fuses for interrupting currents up to 200,000 amp. Bussmann Mfg. Co.

**278—Lighting Fixtures.** New "Twin QQ" pamphlet has 1960 RLM specifications. RLM Standards Institute, Inc.

**279—Motors.** Bulletin GEA-7092 gives data on protective heat-sensing switch protection. General Electric Co.

**280—Adjustable Speed Drive.** Bulletin contains full facts on complete "package" drives. Square D Co.

**281—Motors.** Bulletin #201 has full story about fractional hp. speed control. Sterling Electric Motors, Inc.

## MECHANICAL

**282—Sheaves.** Engineering manuals on multi-wedge, multi-v. and positive drive V-belt sheaves. Worthington Corp.

**283—Drives.** Data on package drive—reducer, driving shaft, etc.—for screw conveyors. Dodge Mfg. Corp.

**284—Worm Gearing.** Catalog (84 pages) covers design, application and selection data. De Laval Steam Turbine Co.

## MAINTENANCE

**285—Paint.** Booklet, "How To Reduce Painting Costs," is free for the asking. Barreled Sunlight Paint Co.

**286—Steam Jenny.** Information on model E-350 all-electric Jenny and Jenolizing. Homestead Valve Mfg. Co.

**287—Visible Records.** Literature on mistake-proof, preventive maintenance systems. Acme Visible Records, Inc.

**288—Coatings.** Here are facts on easy-to-use Bitumastic family of protective coatings. Koppers Co., Inc.

**289—Vacuum Cleaners.** Catalog 155B gives technical data and varied applications. The Spencer Turbine Co.

**290—Floor Machines.** Literature on combination scrubber-vacuum and oil-and-grease solvent. Finnell System, Inc.

**291—Hydraulic Tools.** Information on 20-ton hydraulic puller and wide assortment of adaptors. Snap-On Tools Corp.

**292—Pipe Threaders.** Catalog shows complete line of pipe and bolt threaders. Toledo Pipe Threading Machine Co.

**293—Packing.** Catalog FF-1059 gives facts on new Teflon filament packing and applications. Greene, Tweed & Co.

**294—Paint Pigments.** Write for "Painting With Aluminum" and other booklets. Aluminum Co. of America.

**295—Lubricating Devices.** Catalog on Alemite barrel-to-bearing method with tailored equipment. Stewart-Warner Corp.

**296—Vacuum Cleaners.** "Vacuum Equipment" folder covers cost-saving applications. Invincible Vacuum Cleaner Co.

**297—Protective Coatings.** Technical literature for specific coating problems and applications. Lion Oil Co.

**298—Maintenance Truck.** Job data on dual- and triple-purpose motorized platform truck. Prime-Mover Co.

**299—Power Sweeper.** Here's an illustrated bulletin with full details on new electric floor sweeper. G. H. Tennant Co.

**300—Safety Paint.** Facts on indoor and outdoor safety paints. Five colors. Switzer Bros., Inc.

## PRODUCTION

**301—Drill Press.** Brochure shows new power feed on 20-in. drill press. Delta Power Tool Div., Rockwell Mfg. Co.

**302—Copying Machine.** Information on copying machines for production control. Charles Bruning Co., Inc.

**303—Electronic Tubes.** Two booklets on tubes for many control applications. Sylvania Electric Products Inc.

**304—Plate Magnets.** Complete data on Series 17 magnets for machinery protection and production. Eriez Mfg. Co.

**305—Bin Vibrators.** Comprehensive catalog tells how to handle hard-to-move materials. Eriez Mfg. Co.

**306—Finishing Systems.** Catalog A-660 gives information on automatic metal-cleaning system. The R. C. Mahon Co.

**307—Radiant Heaters.** Bulletin G62 for data on electric heaters for production processes. Edwin L. Wiegand Co.

*Turn the page*

According to Mr. David Greene, of A & G Welding:

# "Bitumastic solved our coating problem without delaying our production"

"Part of the reason for the excellent reputation of our swimming pool filters is their long service life," says Mr. Greene, president of A & G Welding and Boiler Co. in South Kearny, N.J. "And protection of the steel interior of these filter tanks against corrosion is an important factor in obtaining this long life," he continues.

A & G tried numerous coatings before selecting Bitumastic® Tank Solution for the job. Some coatings—even more expensive materials—failed due to undercutting; others just took too long to apply and dry, a drawback from the standpoint of maintaining efficient production. Now, tank heads are hand-brushed and the finished, fabricated tank is coated through a port with a specially designed spray gun. The tight, uniform coating film formed by Bitumastic Tank Solution gives long-lasting protection. And, since this coating was specially formulated for potable water applications, it imparts no taste or odor to the pool water processed by the filter.

Just as this Bitumastic coating solved one manufacturer's problem, you will likely find the answer to most corrosion-preventive requirements in one of the ten Bitumastic products. Whether you're coating your plant or your product, Bitumastic coal-tar based protective coatings can help you do it quickly—and less often. Use the coupon for full details. Koppers Company, Inc., Tar Products Division, Pittsburgh 19, Pa. District Offices: Boston, Chicago, Los Angeles, New York, Pittsburgh and Woodward, Ala. In Canada: Koppers Products, Ltd., Toronto.

**KOPPERS**
**BITUMASTIC**
**COATINGS AND ENAMELS**
*another fine product of COAL TAR*

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OR WRITE FOR COPY

KOPPERS COMPANY, INC.
Tar Products Division
Dept. 135J
Pittsburgh 19, Pa.

Gentlemen:
Please send me more information on the Bitumastic family of protective coatings.

Name_____

Firm_____ Title_____

Address_____

City_____ Zone____ State_____

It's super strong!

It's soft on hands . . . but don't let its luxury touch fool you!

# DISCOVER WHY NIBROC® IS THE BUY!

NIBROC can take it!

Drinks up water in seconds!

Never falls apart!

One towel does the job —saves money!

Make everybody happy! Give 'em NIBROC . . . the most satisfying paper towel you can put your hands on!

Choose from the complete line of NIBROC Quality towels . . . multi-fold, single fold or C-fold in natural, or the super white embossed line—packed in convenient Zip-Top cartons. Write Dept. FO9, Boston, for samples . . . or look under "Paper Towels" in Yellow Pages for name of nearest distributor.

*Another Quality Product of* BROWN COMPANY

*General Sales Offices:* 150 Causeway Street, Boston 14, Mass.


## ADVERTISERS' LITERATURE

*Begins on page 288*

**Offered in ads received up to 5th of last month. To get items you want, circle numbers on Reader Service Card next to back cover.**

**308—Work Center System.** Handbook (56 pages) is packed with money-saving production ideas. Alden Systems Co.

**309—Schedule Boards.** Booklet X200 (24 pages) shows applications of visual control boards. Graphic Systems, Inc.

**310—Time Recorder.** Information on recorder for controlling production time and downtime. Service Recorder Co.

**311—Power Hacksaw.** Complete details on portable unit. Uses 10-in. hacksaw blades. Light weight. Arco Mfg. Co.

**312—Temperature Controls.** Bulletin MC-190 gives technical data on transistorized controllers. Fenwal, Inc.

**313—Separators.** Bulletin 714 tells about removal of oil and water from compressed air lines. R. P. Adams Co.

**314—Drilling, Tapping, Fastening.** Detailed description of tracing templates and prices. Buckeye Tools Corp.

**315—Unitized Containers.** Brochure gives full facts for assembly, production and storage. G. B. Lewis Co.

**316—Manufacturing Facilities.** Information on production capacities of Northern plains area. Northern Natural Gas Co.

**317—Paint Sprayers.** Literature describes hot airless spray painting for product finishing. Nordson Corp.

### PACKAGING, SHIPPING

**318—Addressing Systems.** Bulletin on "Assembly Line" shipment addressing lists applications. Weber Marking Systems.

**319—Rust Preventives.** Two charts show Tectyl preservative specifications and applications. Valvoline Oil Co.

**320—Scales.** Condensed catalog 2001 has complete data on various types of weighing scales. Toledo Scale Corp.

### MATERIAL HANDLING

**321—Trolley Conveyors.** Book 2330 tells about automatic "no hands" overhead handling. Link-Belt Co.

**322—Trukveyors.** Book 2497 contains complete data on in-the-floor truck conveyor system. Link-Belt Co.

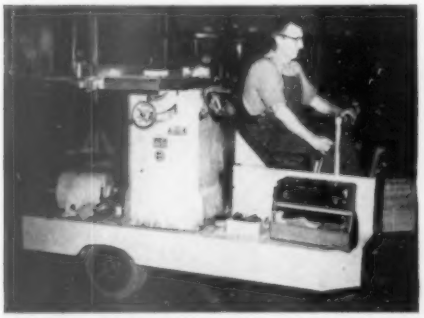
**323—Electric Hoists.** Write for catalog on electric chain and wire rope hoists. Chisholm-Moore Hoist Div.

*Turn the page*

**NEW MAINTENANCE IDEAS**

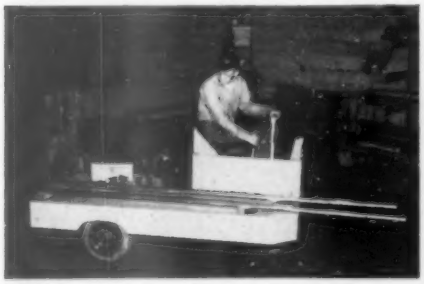
# Here is the proven practical way to *motorize* maintenance departments

**ELECTRICAL** — This 18 sq. ft. of deck area carries the man, the material, and the equipment in one operation.

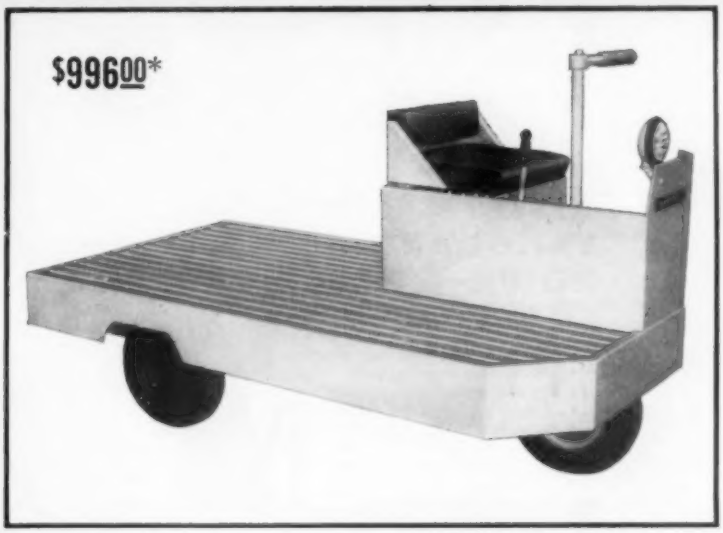


**PLANT ENGINEERING** — Heavy loads of odd sizes and shapes fit on platform with room for tools to do the job on arrival.

**PIPE FITTER** — Speed and maneuverability engineered for maintenance functions on widely scattered jobs inside plants and outside yards.



**MILLWRIGHT** — Ample load capacity for carrying heavy replacement parts such as long heavy shear blades.




## Industries switch to labor-saving PRIME-MOVER F-10 and step up maintenance efficiency three ways:

1. Doubles or triples maintenance man's productivity by *transporting* him to the job . . . The most obvious waste of a workman's time is having him walk to widely scattered jobs. An F-10 gets him there at the top speed permissible under normal plant conditions!
2. Lets him carry the needed materials with him . . . The man doesn't have to depend on someone else to bring materials which ties up other equipment. An F-10 hauls pipe, lumber, fixtures, motors, or odd shaped materials!
3. Moves the *workman* and the *equipment* in *one operation* . . . Almost every maintenance job requires tools and equipment to do the job. An F-10 carries hand tools, power tools, ladders, welding equipment, or special tools.

*An F-10 is an industrial truck built for dependable service in industry — and sold by industrial truck distributors. Write today for job data on how this truck, which lists for only $996.00 F.O.B. factory, can be one of the best investments your plant has ever made.

**PRIME-MOVER CO., Muscatine, Iowa**

Gentlemen: Please send me job data on how PRIME-MOVER F-10 performs for maintenance departments that handle these services:

☐ Electrical ☐ Carpentry ☐ Painting
☐ Pipe Fitting ☐ Millwright ☐ General

YOUR NAME _____

FIRM NAME _____

ADDRESS _____

CITY _____ STATE _____



For more facts Circle 578 on Reader Service Card

**PULL...PUSH with POWER!**

**VANGUARD POWR-WHEEL TRACTOR**

***with electro-magnetic coupling***

- Adaptable for almost all four-wheel trucks
- Rigid coupling allows push or pull movement, eliminates jack knifing
- Flip switch for instant coupling and uncoupling
- Makes all trucks highly maneuverable . . . handles heaviest loads
- Heavy duty battery: 400 amp hour, 12 volt system
- Choice of 3000 lb. GVW, or 8000 lb. GVW
- Also available with mechanical rigid coupling

Vanguard

*WRITE FOR A FREE CATALOG TODAY:*
MANUFACTURING COMPANY
1908 E. 66th St., Cleveland 3, Ohio
Phone: HEnderson 2-0464

**For more facts Circle 579 on Reader Service Card**

**HOW MUCH** did your plant contribute to the $6 BILLION LOSS due to corrosion?

**VALDURA VAL-CHEM COATINGS *STOP* costly corrosion**

Your plant's share of the tremendous loss to corrosion last year could have been stopped with one of Valdura's Val-Chem chemically-resistant coatings. Remember—no one coating can solve all the problems. That's why Valdura offers you a *complete line* to fit every need—the new, field-tested Val-Chem Coatings. The assistance of Valdura's nationwide force of field representatives—experts in corrosion control—is at your service. How can Val-Chem Coatings stop corrosion in *your* plant? Write today on your letterhead for a prompt solution!

AM Valdura

**VALDURA HEAVY DUTY PAINT DIVISION**
**AMERICAN-MARIETTA CO., CHICAGO 11, ILL.**

**For more facts Circle 580 on Reader Service Card**


## ADVERTISERS' LITERATURE

*Begins on page 288*

**Offered in ads received up to 5th of last month. To get items you want, circle numbers on Reader Service Card next to back cover.**

**324—Storage Racks.** Literature covers complete line of storage and material handling racks. Equipment Mfg. Inc.

**325—Carburetors.** Brochures give full details on LP-Gas carburetion systems. Marvel-Schebler Products Div.

**326—Lift Trucks.** Bulletin BU-640 shows "F" Series—3,000-, 4,000-, 5,000-lb. capacity. Allis-Chalmers Mfg. Co.

**327—Batteries.** Booklet, "Why We Use Battery-Electric Industrial Trucks." Gould-National Batteries, Inc.

**328—Steel Shelving.** Catalog contains full information on adjustable steel shelving. Borroughs Mfg. Co.

**329—Conveyor and Elevator.** Catalog 1050 gives data on chains and line of attachments. Link-Belt Co.

**330—Electric Hoists.** Catalog E-58 on speedway hoist line—¼- to 10-ton capacities. Wright Hoist Div., ACCO.

**331—Tiering Trucks.** Bulletin gives information on lease/rental plan for narrow aisle electrics. Raymond Corp.

**332—Tractor Shovels.** Write for data on H-25 front-end Payloader. Others up to 12,000-lb. capacity. Frank G. Hough Co.

**333—Tote Boxes.** Bulletin O-9 has full data on complete line of vulcanized fiber boxes. National Vulcanized Fibre Co.

**334—Hoists.** Bulletin 15025-1C on ¼-, ½-, 1-ton hoists; load lifter, 1- to 15-tons. Manning, Maxwell & Moore, Inc.

**335—Hoists.** Bulletin 15010-15C shows electric push button type. Manning, Maxwell & Moore, Inc.

**336—Trackmobile.** Booklet describes versatile freight car mover and odd-job trackmobile. Whiting Corporation.

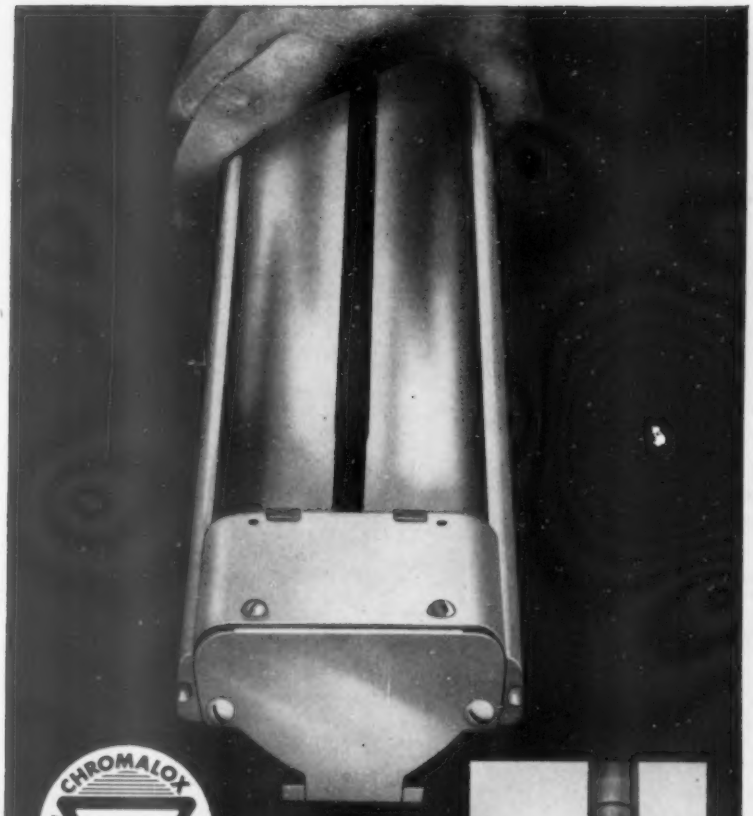
**337—Conveyors.** Bulletin contains information and applications on unit-built systems. Conveyor Specialty Co.

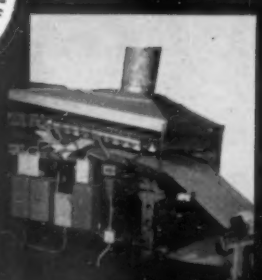
**338—Batteries.** Bulletin covers battery for small trucks and personnel carriers. Electric Storage Battery Co.

**339—Shelving.** Here are facts on Wedge-Lock heavy-weight storage shelving for many uses. Republic Steel Corp.

**340—Metal Lumber.** Data on framing material—2 gages, 2 widths, 10- or 12-ft. lengths. Republic Steel Corp.

*Turn the page*





Precisely controlled Radiant Heaters pre-heat plastic-coated paper for embossing without burning or scorching.

Six long Radiant Heaters form economical, highly efficient oven for curing extruded Teflon tubing.

Radiant heaters in hood cure centrifugally molded glass fiber reinforced torpedo tubes.

Ten radiant heaters automatically controlled for flexible, uniform vacuum forming.

*At the turn of a dial...*

# CHROMALOX

## ELECTRIC RADIANT HEATERS

### fast, uniform, economical, safe

Here's high-intensity heat . . . adjustable from 0 to 100% of heating capacity by fingertip control. Different zones of heat intensity can also be set up . . . by arranging heaters in different "banks" with individual controls for each.

Chromalox Far-Infrared (long wave length) is absorbed almost equally fast by all colors, textures and surfaces . . . including clear glass, plastics, cellophane.

*For heating, baking, drying, curing, pre-heating, dehydrating, pre-expanding.*

Space-saving, non-breakable, all-metal units withstand knocks, bumps, vibration. Moisture-resistant terminals available. No fumes, flames, glare or leaky pipes. Standard heating lengths to 150 inches. Immediate delivery from stock. Low-cost installation and operation. You can build production line heating tunnels, ovens, banks right on the job.

Write for Bulletin G62. Or, for fast action and on-the-job assistance with your heating problem, call your Chromalox Man listed below. 91674

**Call Your Chromalox Man for Heating Answers**

ALBANY N.Y.
Hobart 3-0626

ATLANTA GA.
Trinity 5-7244

BALA-CYNWYD PA.
Mohawk 4-6113
Greenwood 3-4477

BALTIMORE MD.
Hopkins 7-3280

BLOOMFIELD N.J.
Edison 8-6900
New York: Worth 4-2990

BOSTON, MASS.
Liberty 2-1941

BUFFALO, N.Y.
Summer 4000

CHARLOTTE, N.C.
Edison 4-4244
Franklin 5-1044

CHATTANOOGA, TENN.
Amherst 5-3862

CHICAGO, ILL.
Harrison 7-5464

CINCINNATI, OHIO
Trinity 1-0605

CLEARWATER, FLA.
Phone 3-7706

CLEVELAND, OHIO
Prospect 1-7112

COLUMBUS, OHIO
Amherst 7-8260

DALLAS, TEX.
Riverside 8-9004

DAVENPORT, IOWA
Phone: 6-5233

DENVER, COLO.
Glendale 5-3651
Genesee 3-0821

DES MOINES, IOWA
Cherry 3-1203

DETROIT, MICH.
(See Southfield, Mich.)

HOUSTON, TEX.
Capitol 5-0356

INDIANAPOLIS, IND.
Melrose 5-5313

KANSAS CITY, MO.
Victor 2-3306

LOS ANGELES, CAL.
Ludlow 9-6321

MIDDLETOWN CONN.
Diamond 6-9606

MILWAUKEE, WIS.
Broadway 1-3021

MINNEAPOLIS, MINN.
Federal 6-6631

NASHVILLE, TENN.
Cypress 2-7016

NEW YORK CITY, N.Y.
(See Bloomfield, N.J.)

OMAHA, NEB.
341-7600

PHILADELPHIA, PA.
(See Bala-Cynwyd, Pa.)

PITTSBURGH, PA.
Emerson 1-2900

PORTLAND, ORE.
Capitol 3-4197

RICHMOND, VA.
Atlantic 8-8758

ROCHESTER, N.Y.
Hamilton 6-2070

ST. LOUIS, MO.
Chestnut 1-2433

SAN FRANCISCO, CALIF.
Underhill 1-3000

SEATTLE, WASH.
Main 4-7297

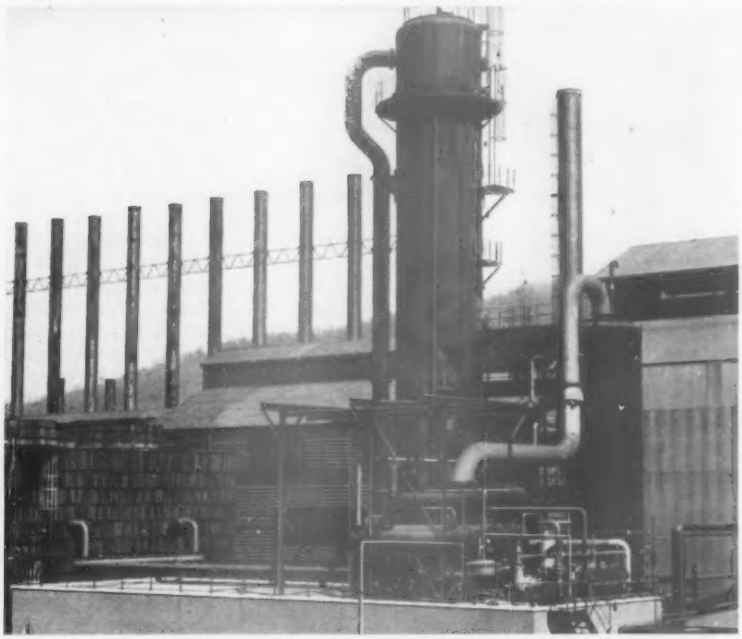
SOUTHFIELD, MICH.
Kenwood 8-2100
Elgin 7-0677

SYRACUSE, N.Y.
Granite 4-3933

WICHITA, KAN.
Amherst 2-5647

**EDWIN L. WIEGAND COMPANY**
7500 Thomas Boulevard • Pittsburgh 8, Pa.
CHurchill 2-6400

# HAGAFILM®
## eliminates reboiler corrosion problem at Clairton Works



*Quick case history—reading time 58 seconds*

**THE PLANT:** Desulfurization Plant at the Clairton, Pa., works of United States Steel Corporation uses steam to heat the reboilers on a stripper column. Condensate formed in the reboilers is collected and used as make-up for two 10,000 pound-per-hour boilers in the Open Hearth area.

**THE PROBLEM:** Lime-soda softened Monongahela River water, used as make-up, produces steam high in $CO_2$. Soon after start-up, the condensate control valve plugged with corrosion products. Tests conducted on the condensate indicated the presence of 0.25 ppm total iron and 8 ppm of $CO_2$. U. S. Steel engineers were concerned not only about the obvious corrosion but about the possible serious damage to the Open Hearth boilers resulting from entry of iron oxide corrosion products.

**THE SOLUTION:** Hall Laboratories engineers recommended 1) installation of vents in the reboilers and 2) the feed of Hagafilm into the steam to reduce corrosion. U. S. Steel followed both of these recommendations immediately.

**TEST RESULTS:** Six weeks after introduction of Hagafilm, corrosion rate was reduced to less than 0.1 mg/dm²/day. Three months later the rate was down to 0.03 mg/dm²/day, and the total iron has been reduced from 0.25 ppm to 0.05 ppm. Corrosion tests in this system are now conducted yearly. The latest check of preweighed test panels indicated a corrosion rate so low the same panels were re-exposed for a second year without further evaluation.

**FOR FULL INFORMATION** on how Hagafilm can solve your corrosion problems safely, quickly, and economically, write for Bulletin 410-12-7 or contact:

**HAGAN**
**CHEMICALS & CONTROLS, INC.**
HAGAN CENTER, PITTSBURGH 30, PA.

**HAGAN** DIVISIONS: CALGON CO., HALL LABORATORIES, BRUNER CORP.


## ADVERTISERS' LITERATURE

*Begins on page 293*

**Offered in ads received up to 5th of last month. To get items you want, circle numbers on Reader Service Card next to back cover.**

**341—Tramrails.** Report, "Automatic Dispatch Portfolio," explains handling systems. Cleveland Tramrail Div.

**342—Lift Truck.** Catalog has data on "F-45T" electric 3000- and 4,000-lb. truck. Elwell-Parker Electric Co.

**343—Monorail and Cranes.** Booklet shows how to get best in material handling methods. The Louden Machinery Co.

**344—Vertical Conveyor.** Free brochure tells how it works and how it solves problems. Standard Conveyor Co.

**345—Lift Truck.** Literature gives complete information on exclusive Monotrol driving feature. Hyster Co.

### BUILDING

**346—Sealants.** Full information on properties of sealant based on polysulfide polymer. Thiokol Chemical Corp.

**347—Plastic Panels.** Folder SL-1 describes superiority of panels; gives glazing details. Structoglas Inc.

**348—Trackage.** Catalog FA-9 contains details about trackage, switch material, and accessories. L. B. Foster Co.

**349—Drainage Pipe.** Catalog has 16 pages on corrugated metal pipe, pipe-arch. Armco Drainage & Metal Products.

**350—Floor Grating.** Here's new catalog that provides structural data and suggests varied applications. Globe Co.

### PLANT SERVICES

**351—Unit Heaters.** Catalog 158 lists sizes, other details of horizontal, vertical and power-throw types. Modine Mfg. Co.

**352—Air Conditioning.** Booklet, "Will factory air conditioning pay off for me?" Carrier Air Conditioning Co.

**353—Steel Lockers.** Information covers styles, properties, and special structural features. Republic Steel Corp.

**354—Dust Filters.** Catalog 104 (36 pages) gives full data on new Dynaclone dust filter bags. W. W. Sly Mfg. Co.

**355—Water Coolers, Fixtures.** Literature describes low-level, free-standing, and other styles. The Halsey W. Taylor Co.

**356—Shop Equipment.** Catalog shows complete line benches, desks, cabinets, shelving, etc. Standard Pressed Steel Co.

*Turn the page*



For more facts Circle 582 on Reader Service Card

For more facts Circle 583 on Reader Service Card ➤

# A GUARANTEED ROOF OVER YOUR HEAD

## *New...and only with Butler... full 20-year roof protection for pre-engineered buildings*

Here's another reason to "go Butler" for your new building this year. You can have a preferred aluminum roof so superior that we are now able to offer a *20-year guarantee.*

This is the first long-term roof guarantee ever offered for pre-engineered buildings. It is made possible by Butler's leadership in designing and fabricating an enduring, weatherproof aluminum roof system that today has an impressive history of outstanding job performance on thousands of Butler Buildings. Be sure that this new development in roof security, optional at nominal extra cost, is considered in your new building plans.

**Your Lowest-Cost Way to Build Well**—superior roof protection is one of many reasons why more offices, plants, stores, warehouses, terminals, recreation centers, schools and churches every year are being built with the Butler Building System.

For your new building, take advantage of the wide, clear spans of Butler rigid frames . . . the beautiful new Butler-Tone™ baked-on color finishes for wall and roof panels . . . your choice of the finest factory-insulated or field-insulated exterior wall panels . . . the fast, trouble-free construction . . . and the dependable, talented services of the nationwide group of Butler Builders.

Interested? See your Yellow Pages for the name of your Butler Builder, under "Buildings" or "Steel Buildings." Ask about financing, too . . . or write direct.

"See Sweet's Industrial Construction File—Section 6-B"

MBMA METAL BUILDING MANUFACTURERS ASSOCIATION

BUTLER

**BUTLER MANUFACTURING COMPANY**

7375 East 13th Street, Kansas City 26, Missouri

Manufacturers of Metal Buildings • Plastic Panels • Equipment for Farming, Transportation, Bulk Handling, Outdoor Advertising • Contract Manufacturing

Sales offices in Los Angeles and Richmond, Calif. • Houston, Tex. • Birmingham, Ala. • Kansas City, Mo. • Minneapolis, Minn. • Chicago, Ill. • Detroit, Mich. Cleveland, Ohio • New York City and Syracuse, N.Y. • Washington, D. C. • Burlington, Ontario, Canada

ENGINEERING DETAILS MAKE THE DIFFERENCE

At Connors, experienced trackwork engineers design and guide the fabrication of your replacement or new track layouts to assure prompt and precise completion of your order. Every detail is pre-checked to make possible rapid installation at your track site. Contact Connors for:

- light rails
- frogs
- switches
- guard rails
- gauge rods
- crossings
- switch stands
- steel ties
- turnouts.

CONNORS STEEL DIVISION
PORTER
H.K. PORTER COMPANY, INC.

*For further information or catalog, write:*
**West Virginia Works, P. O. Box 118, Huntington, West Virginia**




## ADVERTISERS' LITERATURE

*Begins on page 238*

**Offered in ads received up to 5th of last month. To get items you want, circle numbers on Reader Service Card next to back cover.**

**357—Deodorants.** Literature tells about Rounds, the deodorant discs for plant sanitation purposes. The C. P. Dolge Co.

**358—Acoustical Booths.** Bulletin A-142-4T gives data on Model 45, Hear-Here Acousti-Booth. Burgess-Manning Co.

**359—Washfountains.** Bulletin K-1204 on foot-control models in six colors, stainless steel. Bradley Washfountain Co.

**360—Fans.** Catalog 707 contains performance tables, dimensions, system data on exhauster fans. Clarage Fan Co.

**361—Shop Equipment.** Catalog illustrates diversified line of steel shop equipment. Lyon Metal Products, Inc.

**362—Industrial TV.** Write for copy of closed-circuit TV system planning guide. Gives many applications. Philco Corp.

**363—Blower and Exhaust Fans.** Two bulletins, FMB-935 and FI-110, provide complete data, sizes, etc. Buffalo Forge Co.

**364—Meters.** Bulletin 43 describes high-pressure, steam-jacketed, and Electri-contact models. Buffalo Meter Co.

**365—Storage Drawers.** Catalog 302 (32 pages) shows extensive line of drawers, and drawer units. Equipto.

**366—Plant Music.** Booklet, "Music and Muzak," gives detailed information on work-motivation music. Muzak Corp.

**367—Compressors.** This illustrated and detailed Catalog 1960 is available on request. Norwalk Co., Inc.

**368—Metal Hose.** Catalog ID-100D describes complete line of flexible hose products. Universal Metal Hose Co.

---

## Human relations help

Here are some of FACTORY's reprinted articles on human relations. Order them (by code number) from FACTORY Reader Service, 330 W. 42nd St., New York 36.

**35¢ per copy**
A172 Sure Way to Measure Managers
A185 How to Measure Your Managers
A207 Three Rules to Help You Stop the Thieves in Your Plant
A213 Shift Scheduling Made Easy

**50¢ per copy**
A126 Taking the Doubletalk Out of Communications
A153 Tips to Successful Discipline
A170 Handling the Problem Worker

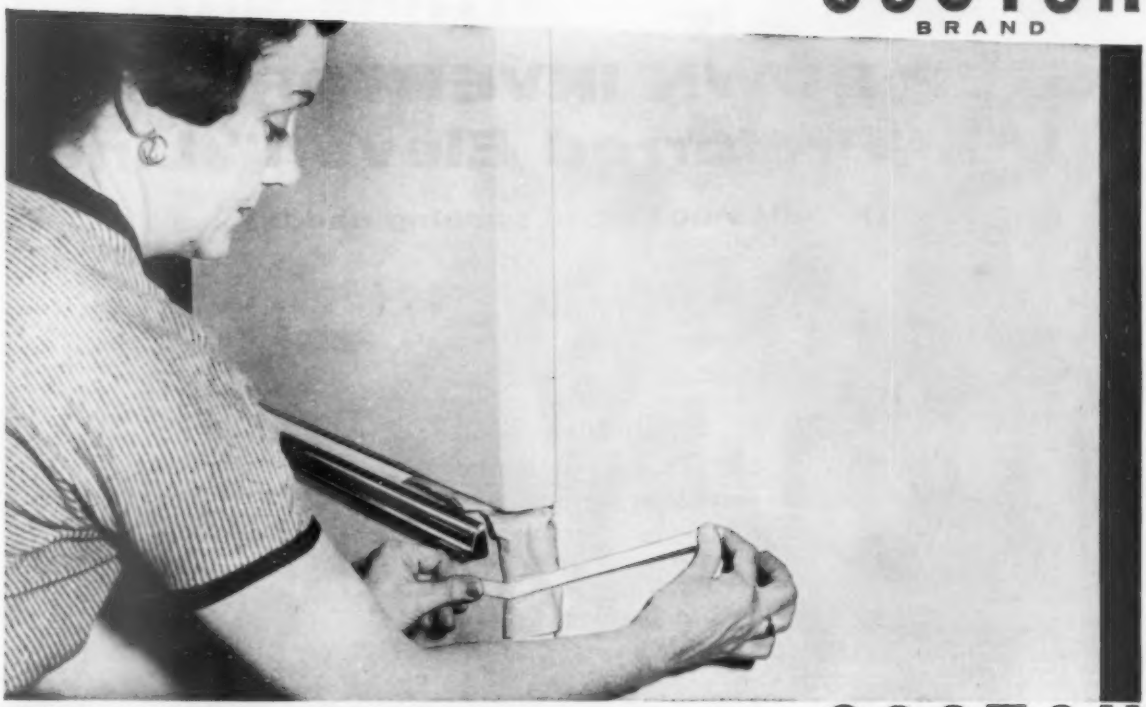

LOOK, BOSS... KENNETTS ARE

They're made of National Vulcanized Fibre, a cellulosic plastic. Come in a "jillion" styles and sizes for any materials handling need.

Get the full, cost-cutting Kennett story now. Write for Bulletin O-9 today.

KENNETT
RECEPTACLES BY
NATIONAL
VULCANIZED FIBRE CO.
WILMINGTON 99, DELAWARE

SCOTCH
BRAND



TAPEnology . . . industry's newest cost cutting tool

# TAPE KEEPS APPLIANCES SHIP-SHAPE FROM SHIPPING ROOM TO SHOW ROOM

All it takes is a few pennies worth of various "SCOTCH" BRAND Filament Tapes to protect many dollars worth of merchandise. These tapes, developed specifically for the appliance industry, stand up to the roughest, toughest handling. A few short strips hold drawers, shelves, lids, and latches securely in place during shipment. Keeps them in their place in spite of jolts, jars, and jiggles.

On in seconds, "SCOTCH" Filament Tapes stick at a touch . . . no heavy tools or muscles needed. Won't scratch or mar finishes. Won't cut customers' or employees' hands. What's more, "SCOTCH" Filament Tapes strip off quickly and cleanly upon arrival without staining or leaving a trace of residue on finished surfaces.

**What's your line?** "SCOTCH" BRAND Filament Tapes offer dozens of time and cost-saving shortcuts. Holding, bundling, carton reinforcing, unitizing just to mention a few. For more information, call your nearest "SCOTCH" BRAND Tape Distributor, or write: 3M Co., 900 Bush Ave., St. Paul 6, Minn., Dept. IAE-90.

**When tape costs so little, why take less than "SCOTCH" Brand?**

"SCOTCH" IS A REGISTERED TRADEMARK OF 3M CO., ST. PAUL 6, MINN. EXPORT: 99 PARK AVE., NEW YORK 16. CANADA: LONDON, ONTARIO.

MINNESOTA MINING AND MANUFACTURING COMPANY
. . . WHERE RESEARCH IS THE KEY TO TOMORROW

3M COMPANY

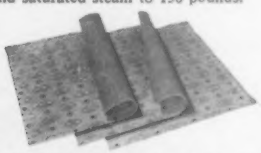
SCOTCH
BRAND
SCOTCH
BRAND
SCOTCH
BRAND
SCOTCH
BRAND
SCOTCH®
BRAND
SCOTCH
BRAND

US RUBBER PACKINGS

# STEP DOWN INVENTORIES...
# U. S. "Preferred Eleven" Line

**(Handles 90% of all packing needs)**

**U. S. Rainbow® Sheet Packing—The Original Red Rubber Sheet.** For service on flanges and other parallel surfaces, against hot and cold water, air and saturated steam to 150 pounds.



**U. S. 899 F.O.P. Compressed Asbestos Sheet Packing—Plain or Graphited.** Most effective gasket material for superheated or saturated steam, air, ammonia, gases, oil, gasoline, water, some acids, alkaline solutions and other chemicals up to 750 deg. F.

**U. S. Diaphragm Sheet Packing.** For pressure regulators, pressure switches, motor valves, controlling a wide variety of fluids or gases. Available to handle a broad range of pressure differentials.

**U. S. Centrifugal Pump Packing.** For centrifugal pumps, rotating or oscillating rods or shafts. Handles hot or cold, fresh or salt water, oil, brine, weak acids, weak caustic solutions and ammonia.

**U. S. Special Blue Asbestos Acid Packing.** Designed for use on centrifugal pumps handling hot or cold acids, chemicals and strong caustic solutions. Thoroughly graphited and treated with special acid-resisting lubricant.

The U.S. "Preferred Eleven" Line cuts to a minimum the number of packings required to service your needs.

When you use this line you find:
- Simplified inventories
- Savings in storage and shelf space

Look at the Preferred Eleven Line on this page. Note how it answers a very wide range of packing needs. You can put your finger instantly on the right packing for the particular job. Call us for instant assistance.

P.S. We will also provide you with packings and engineering assistance to fill the few remaining requirements not covered by the U.S. Preferred Eleven Line.

**U.S. Rain-Besto® Rod and Plunger Packing—for** reciprocating or oscillating rods and plungers. Controls against high-pressure steam, air and gas up to 500 degrees F (available in spiral, coil and ring form). Made of selected asbestos cloth woven from tightly twisted yarn with non-hardening cushion (treated with heat-resistant lubricants and preservatives and with a graphite finish).

**U. S. Wizard Round Braided Asbestos Packing.** For valve stems, reciprocating rods, plungers, centrifugal pumps handling steam, air, hot water, ammonia, oil, chemicals and some acids.

**U. S. Peerless® Canvas Pump Packing.** Top service for cold water on inside packed pumps. Fine for end rings in hydraulic sets where U.S. Royal Long-Line Flax Packing is used as center rings.

**U. S. Peerless Cross Expansion Packing.** For reciprocating rods and plungers, for medium- or low-pressure steam, hot or cold water, ammonia, alcohol, light and mineral seal oils.

**U. S. Flexible Metallic Packing.** For centrifugal and reciprocating rods, shafts and plungers; and on equipment handling acids, caustics, oil, gas, steam, air and many other fluids and gases at temperatures up to 1500 deg. F—at unlimited pressures.

**U. S. No. 414 Solvent Packing.** For centrifugal pumps handling aromatic (coal tar) and petroleum base solvents. A good acid-resistant packing and recommended for withstanding mixtures of acids, caustics and solvents.

US RUBBER

Mechanical Goods Division

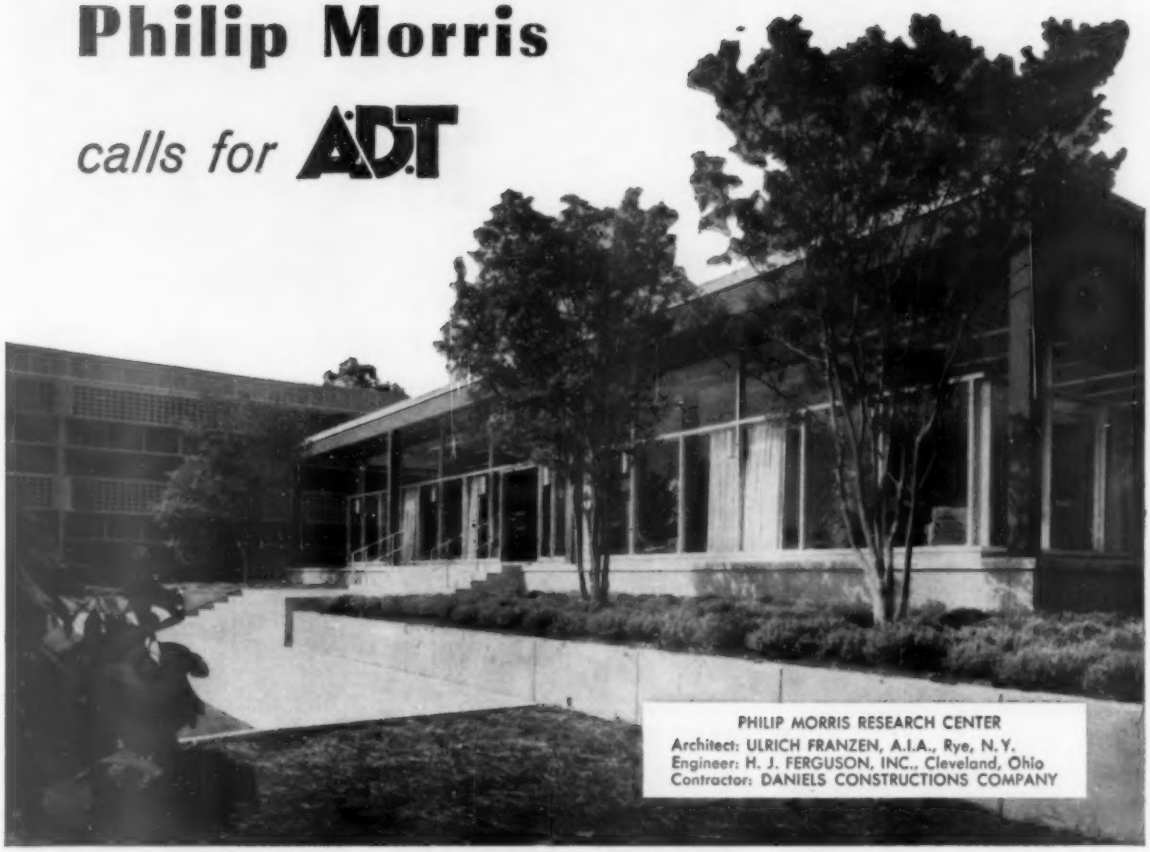
## United States Rubber

WORLD'S LARGEST MANUFACTURER OF INDUSTRIAL RUBBER PRODUCTS

Rockefeller Center, New York 20, N.Y. In Canada: Dominion Rubber Company, Ltd.

# Philip Morris

## *calls for* ADT



PHILIP MORRIS RESEARCH CENTER
Architect: ULRICH FRANZEN, A.I.A., Rye, N.Y.
Engineer: H. J. FERGUSON, INC., Cleveland, Ohio
Contractor: DANIELS CONSTRUCTIONS COMPANY

Yes, to safeguard its new research center at Richmond, Va., Philip Morris Inc. *did* call for the services of American District Telegraph Company.

ADT Protection has proved its value to Philip Morris at more than a score of their properties from coast to coast.

The new scientific facilities at Richmond comprise a multimillion-dollar investment. ADT was chosen to assure the continuity of operations as well as to provide security and protection.

Ultramodern in architecture, the three interconnected buildings are safeguarded by a combination of ADT central station sprinkler supervisory and waterflow alarm service and Watchman's Reporting Service. This entire protection system is under constant electrical supervision by the ADT central station in Richmond.

ADT is proud to have been selected to protect these impressive Philip Morris buildings. We are also proud of our part in protecting the lives, property and profits of 70,000 other subscribers throughout the country.

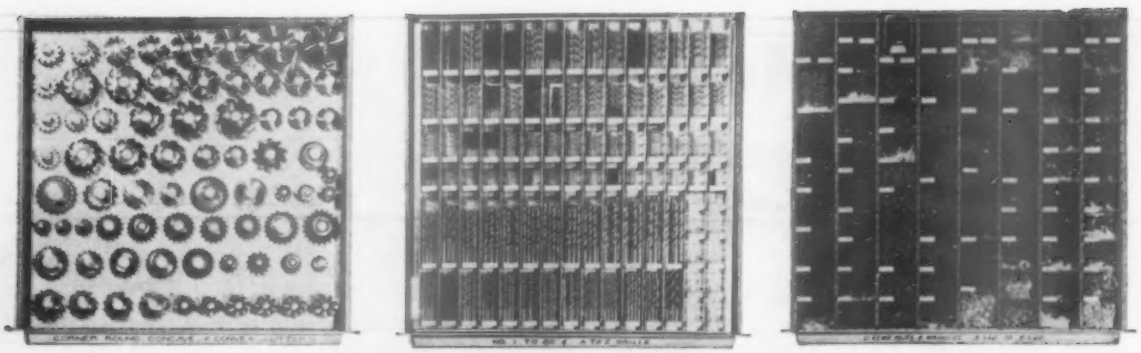
Perhaps ADT can provide greater security for your property—with substantial savings. Why not call the ADT representative listed in your telephone book and find out?

Controlled Companies of

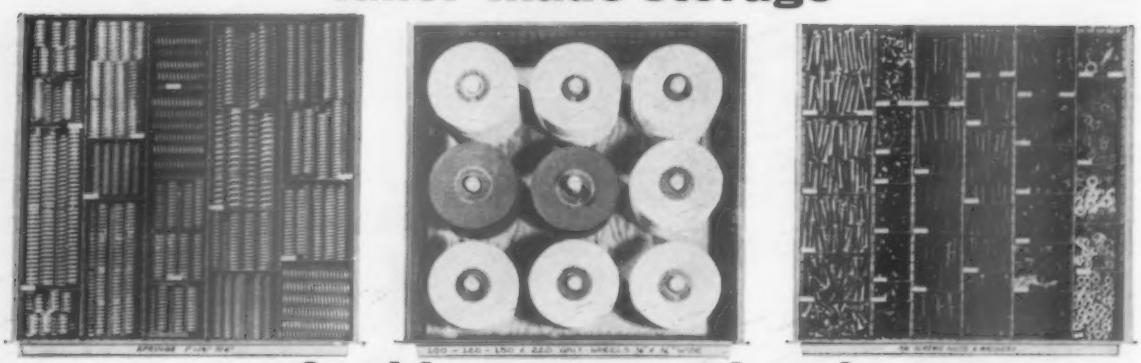
**AMERICAN DISTRICT TELEGRAPH COMPANY**

A NATIONWIDE ORGANIZATION

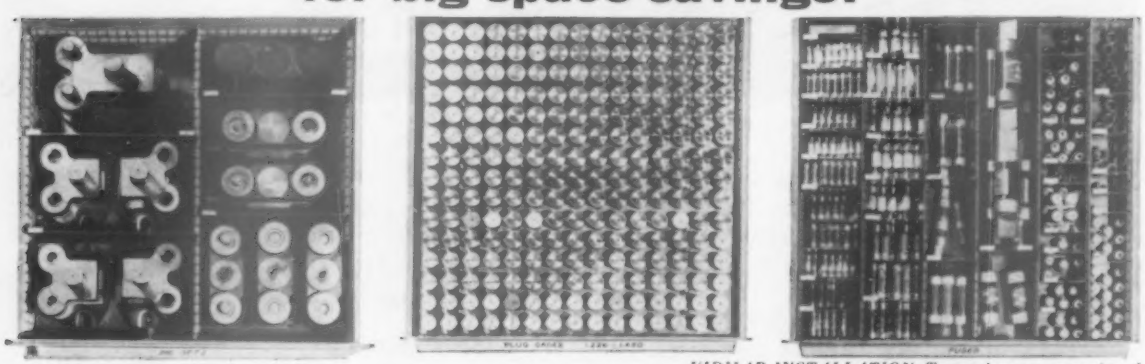
EXECUTIVE OFFICE: 155 SIXTH AVENUE, NEW YORK 13, N.Y. 6-144



# Tailor-made storage



# for big space savings!



*VIDMAR INSTALLATION. Tremendous concentration of industrial parts in a small space. Orderly, clean, efficient.*

**Vidmar industrial storage cabinets** are expressly planned and built to accommodate the sizes, shapes and weights typical in industrial parts, tools, gages, accessories and sub-assemblies. They are modular—can be added-to or re-arranged at any time; and they are strong...a single drawer holds up to 400 lbs. without even sagging!

In the Vidmar system, every tool and part has its place—fully visible and accessible... clean, safe, and readily located through large labels running the full length of drawers. Space savings average 50%.

THAT'S PART OF THE STORY. Before you revise or add to your storage facilities, or plan the storage in new construction, it will pay you to look into the many time- and money-saving advantages of the Vidmar system. Write today. **VIDMAR, INC.,** 2325 Reach Road, Williamsport, Pa.

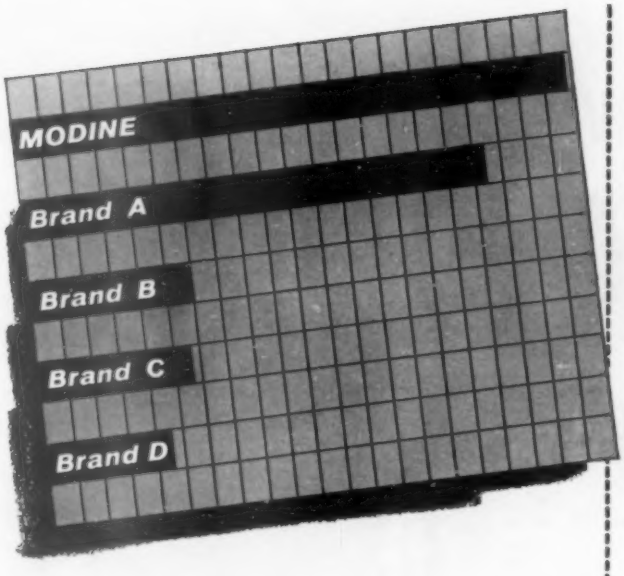
**Store more...better...in less space with**

**Vidmar CABINETS** Division of VOLKERT STAMPINGS, INC.

FACTORY



For more facts Circle 589 on Reader Service Card




The chart represents the results of a steam and hot water unit heater survey made by a leading industrial magazine. In answer to the question "Which brand do you prefer?" Modine was a solid . . .

# FIRST CHOICE

## among men who buy unit heaters

**HORIZONTAL**
Can be direct-from-pipe suspended . . . without other supports. Vertical louvers may be added for complete directional control. 24 sizes.

**VERTICAL**
Available in 28 sizes . . . choice of 4 air deflectors. Depending upon size selected, mounting height may vary from 10 to 60 feet.

**POWER-THROW®**
For hard-to-heat locations. High-velocity discharge assures exceptionally long heat-throw . . . up to 140 feet. Offered in 10 sizes.

For over thirty years, Modine steam and hot water unit heaters have been a consistent first choice for commercial and industrial applications. They're ideal for new buildings or modernization . . . pay off in perfect comfort, at low fuel costs, with minimum maintenance.

Here are just a few of the features of Modine's line: attractive styling; three distinct designs . . . horizontal, vertical, Power-Throw; lightweight, yet extremely durable construction; high capacity on steam or hot water systems; die-formed casings; a complete line of low-outlet-temperature models for high pressure systems; extra-heavy die-formed fins for added strength and maximum heat transfer; vertical fin design that discourages accumulation of dust and dirt.

**CATALOG 158** *contains full details. See your distributor or write Modine Manufacturing Co., DeKoven Ave., Racine, Wisconsin.*

*In Canada: Sarco Canada, Ltd., Toronto, Ont.*

***Immediate delivery from local stock!***
Modine wholesalers are located in all principal cities. Call the Modine representative nearest you . . . he's listed in the yellow pages.

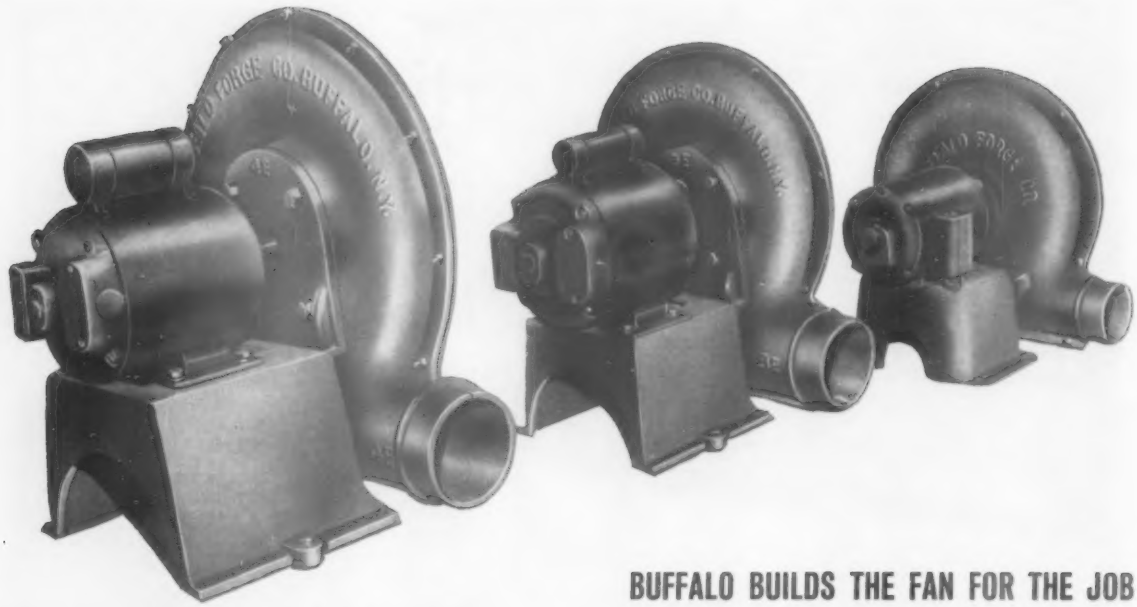
SU-1388

Also from the world's most complete unit heating line

**Modine**
FIRST NAME IN UNIT HEATING



For more facts Circle 590 on Reader Service Card



## BUFFALO BUILDS THE FAN FOR THE JOB

# BLOWING • EXHAUSTING

**FOR PRESSURIZED AIR APPLICATIONS** Buffalo Type "E" Blowers are compact, husky units in 5 sizes up to 5500 cfm, for constant pressures up to 2 lbs., on direct-connected applications such as:

- Oil or gas furnace blowing
- Cupola blowing
- Gas line boosting
- Exhausting from grinding wheels
- A quality unit to put on equipment you sell.

A number of these efficient motor-driven units can provide power and installation savings over one large blower — plus flexibility of operation. For full details, write for Bulletin FMB-935.

**FOR EXHAUSTING AIR OR MATERIALS** Buffalo Industrial Exhausters are ruggedly built to handle the most punishing air or materials handling jobs. Their heavy steel plate housing is welded throughout. Wheels and blades are all-welded. Available in designs with heat slinger for moving hot gases (200° to 850° F.) — for handling corrosive fumes — or for moving abrasive or stringy materials such as emery dust, chips and shavings. Write for Bulletin FI-110 or consult your nearby Buffalo Engineering Representative about the complete line of Buffalo Fans for every air job in industry.

**BUFFALO FORGE COMPANY** BUFFALO, NEW YORK

Buffalo Pumps Division • Buffalo, N. Y.

Canadian Blower & Forge Co., Ltd., Kitchener, Ont.

"Buffalo"

VENTILATING • AIR CLEANING • AIR TEMPERING • INDUCED DRAFT • EXHAUSTING • FORCED DRAFT • COOLING • HEATING • PRESSURE BLOWING



For more facts Circle 591 on Reader Service Card

*Another first from Standard Conveyor*

# New continuous vertical conveyor revolutionizes floor-to-floor movement

*Escaveyor* self-loads, self-unloads, lifts products straight up or down without tipping or jarring. Provides smooth up, down, or reversible service.*

**How Escaveyor speeds production.** Here is the answer to your big need for a fast, continuous flow of commodities from floor to floor. Escaveyor moves commodities at a steady rate of 8 to 10 loads per minute.

**How Escaveyor saves space.** Escaveyor lifts packaged or unit commodities rapidly from floor to floor with the continuity of a belt conveyor. Yet your product always rides level. And look at the huge saving in space! It takes even less floor space than a conventional monostrand or straight-lift conveyor! Escaveyor's size is tailored to fit your package.

**How Escaveyor costs less.** Escaveyor actually costs less to purchase and install than practically any other type of lift. It requires less manpower because no manual loading or unloading is required. You also save many square feet of valuable floor space.



**Free brochure.** Send for free Escaveyor brochure! It tells how Escaveyor works, and how it can solve vertical material handling problems for *you!* Get your copy from Standard Conveyor Company, Dept. G-9, North St. Paul 9, Minnesota, or from your nearby Standard Conveyor sales representative.

*patent pending

**Standard Conveyor**

Sales and Service in over 40 Cities
Consult your Yellow Pages



**For more facts Circle 592 on Reader Service Card**

# BUNDLE...BOX...BALE

## *If you tie your shipments... here are 12 pointers to superior results at less cost*

**1** • Steel strapping is strong. Even our smallest size has a tensile strength over 400 pounds; our largest, over 15,000 pounds. This strength is unaffected by age, heat, cold, moisture, or dryness.

**2** • And it is low in cost. For equal lengths of equal strength, we haven't found anything that costs less than steel.

**3** • You can pull high tension with steel strapping, and it holds without stretching. This tension is what binds your load together, or reinforces your package.

**4** • Signode steel strapping is a quality product, carefully made and constantly improved to do its job better. It is available from Signode in a wide range of sizes.

**5** • Because it is well made, Signode steel strapping is smooth and safe to handle.

**6** • It is firm and straight, easy to put on square, without kinks, twists, or tangles.

**7** • It is flexible enough to loop easily around a package or bundle and to pull tight around corners.

**8** • It is joined by a visible, inspectable mechanical seal that is dependable in spite of dirt, moisture, or oil. This seal can show your trademark in colors.

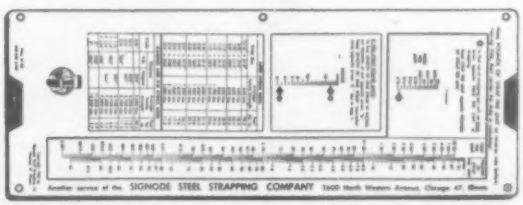
**9** • It cannot be slipped on and off your package, bundle or bale... prevents pilferage.

**10** • It can be applied at any desired speed, without waste, with fast Signode hand tools, power tools, and automatic machines.

**11** • Signode men train your operators, keep Signode tools in good order, suggest ways to reduce your cost and improve your results. Signode has specialized in steel strapping for over 45 years.

**12** • There are three Signode manufacturing plants, each with its own sources of steel, to assure you of the steel strapping you need, even in times of shortage.

*New free Steel Strapping Calculator helps you buy steel strapping at least cost according to your needs, and shows new strength figures for Signode steel strapping. Let us send you one.*




SIGNODE

*First in steel strapping*

**SIGNODE STEEL STRAPPING CO.**

**2663 N. Western Avenue, Chicago 47, Illinois**

Offices Coast to Coast. Foreign Subsidiaries and Distributors World-Wide
In Canada: Canadian Steel Strapping Co., Ltd., Montreal • Toronto



For more facts Circle 593 on Reader Service Card

# How to Play the Angles with Sylvania's Very High Output Fixtures

Sylvania's very high output fixtures assure excellent lighting from every angle for servicing in this Vehicle Maintenance Department.

Here's an installation showing Sylvania's very high output fixtures utilized in a unique way to take full advantage of their tremendous light output.

In this Vehicle Maintenance Department, banks of fixtures using very high output lamps are mounted at angles to provide general high level illumination and more direct lighting for under-the-hood repairs.

To control lamp brightness and thus improve eye comfort, louvers are installed on all fixtures.

The result is an abundance of quality illumination for all maintenance jobs with shadows and direct glare minimized. Normally hard-to-see locations can be worked on without inconvenient and ineffective "trouble lights."

This example shows how the light output of 1500 ma lamps can be controlled and utilized practically to provide *quality* illumination together with high quantity.

Think for a minute about the lighting situation in your plant. Chances are that Sylvania's very high output fixtures can provide the answer to your lighting problems . . . and economically, too . . . whether you're thinking of relighting or a new installation.

Why not look into it? Complete information will gladly be sent on request.

SYLVANIA LIGHTING PRODUCTS
A Division of SYLVANIA ELECTRIC PRODUCTS INC.
One 48th Street, Wheeling, W. Va.

# SYLVANIA

*Subsidiary of* **GENERAL TELEPHONE & ELECTRONICS**

GENERAL SYSTEM



For more facts Circle 594 on Reader Service Card

Special vented nozzle easily fits beneath conveyor pan.

This Invincible vacuum system has paid for itself in savings in less than one year. Used at Ohio Products Company to clean up spillage from the mold sand conveyor, it:

- Does the job in 4 hours instead of the 16 per week formerly required.
- Eliminates weekend work at time-and-a-half pay, thus saving the equivalent of 20 hours in weekly wages.
- Assures uninterrupted conveyor operation at this Orrville, Ohio, foundry of The Ohio Injector Company.

After castings have been made, mold sand is dumped from flasks through a grate onto a vibrating pan conveyor in a covered trench. Sand spills over the sides of the conveyor, collecting underneath the pan and along the sides of the 180-foot trench. If allowed to build up, it can impair, or halt, conveyor operation.

*Before Invincible:* Every Saturday, workers removed flooring over sections of the trench and used small shovels to scoop up the sand. This took 16 man-hours (equivalent to 24 hours of wages), yet it was impossible to do a thorough job.

*With Invincible:* Night-shift worker lets Invincible do the work. Powerful suction draws sand from beneath conveyor pan and other hard-to-get-at spots. Complete cleaning eliminates a possible cause of conveyor failure, and the job takes only 4 hours. In addition, the Invincible is used for general cleaning, thereby further reducing maintenance costs.

*Check the Many Uses for Invincibles.* Send for new "Invincible Vacuum Equipment" folder. It describes many cost-saving applications.

# *INVINCIBLE*

*vacuum cleaner manufacturing co., Dover, Ohio*

# Thor

## Everything you want in Air Grinders . . .

*and more!*

Thor No. 5 series heavy duty air grinders. Safest grinders ever built. 100% increase in power at no increase in weight. Remove far more metal in far less time. Positive safety control, in addition to standard governor, absolutely prevents "run-away" tools. If governor fails, air supply is cut off. Weight 10 lbs. Grip, lever or butterfly throttle. 4,500 and 6,000 r.p.m. grinding speeds.

Thor has a complete range of air grinder sizes and models. There's a Thor grinder to fit any metal removing or finishing problem. Your Thor factory representative or distributor will demonstrate. Thor Power Tool Company, Aurora, Illinois. Branches in all principal cities.

Thor POWER TOOLS



For more facts Circle 596 on Reader Service Card

Let Superior Help You—

SHORTEN HONING TIME

ACHIEVE A BETTER FINISH

CUT PRODUCTION COST

EXTEND STONE LIFE

MODEL "HM" HONEMASTER

Adjustable hydraulic system assures constant stone pressure, continuous cutting with no fall off due to wear or stock removal.

Infinitely variable speed (250 to 1150 rpm.).

Single control dial shows when first piece is coming to finish size. Set, then thereafter just compensate for stone wear.

Hydraulic clutch and brake.

Stocked in all principal cities.
Send for details and prices.

SUPERIOR HONE CORPORATION
1617 ELRENO STREET • ELKHART, INDIANA

For more facts Circle 597 on Reader Servcie Card

If you can't eliminate drips... prevent slips with SOL-SPEEDI-DRI®

*Cleans, slip-proofs floors in a jiffy!*

Here's low-cost accident insurance in a bag! Spread amazing SOL-SPEEDI-DRI carpet of safety on with a rake or broom...thirsty granules *pull deep deposits of oil, grease or liquid out of floor.*

Leave on, or remove and *reuse* until saturated! Mineral...won't burn! Each lb. contains over 13 acres of absorptive surface area. ... *and no dust problem with SSD!*

*Write today for generous* **Free** *sample!*

SPEEDI-DRI DIVISION
Minerals & Chemicals Corporation of America
100 Essex Turnpike, Menlo Park, N. J.

For more facts Circle 598 on Reader Service Card

From the World's largest Manufacturers of
COMMERCIAL & INDUSTRIAL INCINERATORS

FREE JOSEPH GODER Waste Disposal SURVEY OF YOUR PLANT

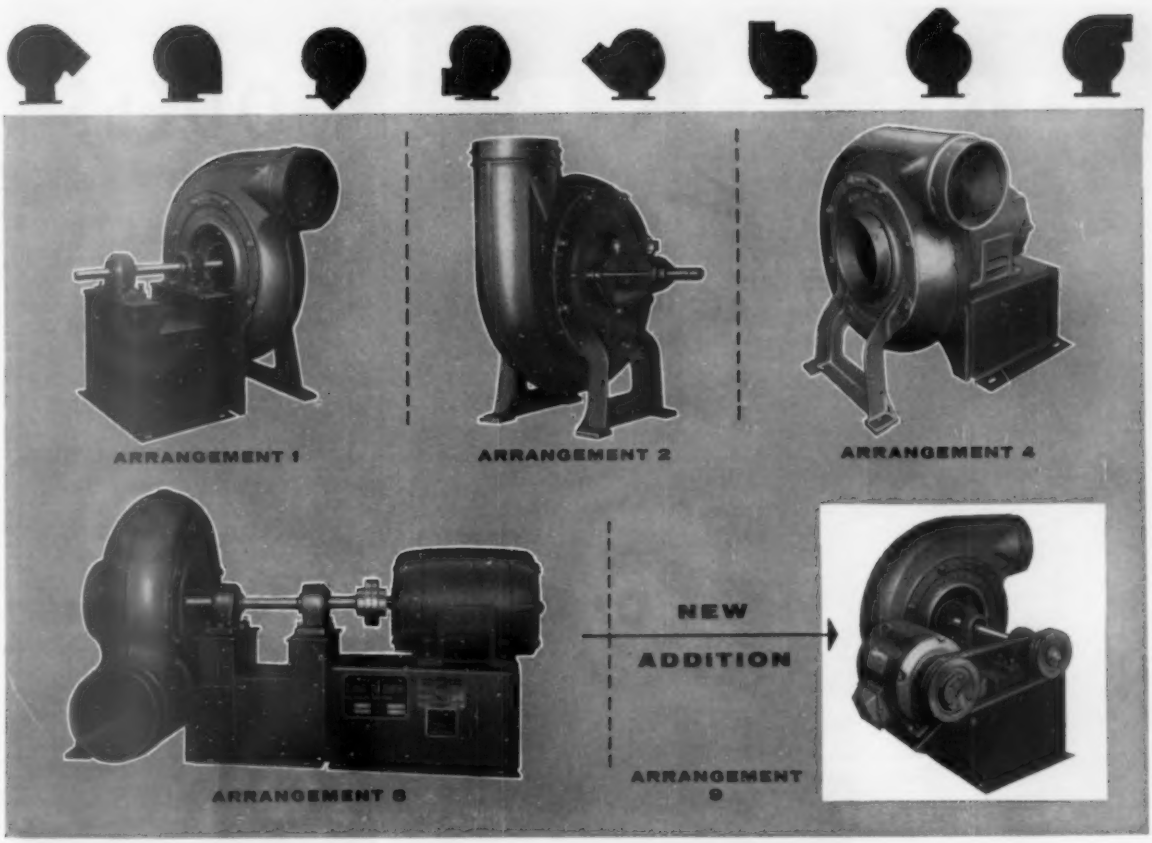
- complete destruction of waste
- no-smoke, no-odor air pollution control
- important dollar savings in operation
- small, medium or large factory, there's a Joseph Goder Incinerator to handle every waste disposal problem better.

Joseph Goder Incinerator specialists will survey and check your waste disposal methods and/or installation. They may uncover hidden losses in equipment or in messy, wasteful scavenger service, needed minor repairs or recommend standard replacements of outmoded incinerators.

*Write for Catalog or See the Yellow Pages for name of nearest Joseph Goder Representative.*

JOSEPH GODER INCINERATORS
4235 N. HONORE ST. • CHICAGO 13, ILL.

For more facts Circle 599 on Reader Service Card




# Presenting... *the new line of CLARAGE Type CI Exhausters*

Volumes to 3800 CFM, pressures to 18″, temperatures to 750°F., six sizes, three wheel types, five arrangements as shown above, adjustable to any of the eight standard air discharge directions.

Result: fan equipment uniquely well suited to nearly every service imaginable. The uncomplicated, heavy construction, featuring cast iron housings and sideplates, makes the Type CI the natural selection for such severe applications as exhausting from grinding, woodworking, and other machines . . . conveying materials ranging from fibers to grains . . . removing smoke and fumes . . . furnishing industrial process air . . . handling chemical and hot gases.

Write for new Catalog 707 containing performance tables, dimensions, and system data. Get acquainted with the advantages you'll enjoy by choosing Clarage Type CI Fans for your next requirements. CLARAGE FAN COMPANY, Kalamazoo, Michigan.

*Dependable equipment for making air your servant*

## CLARAGE FAN COMPANY

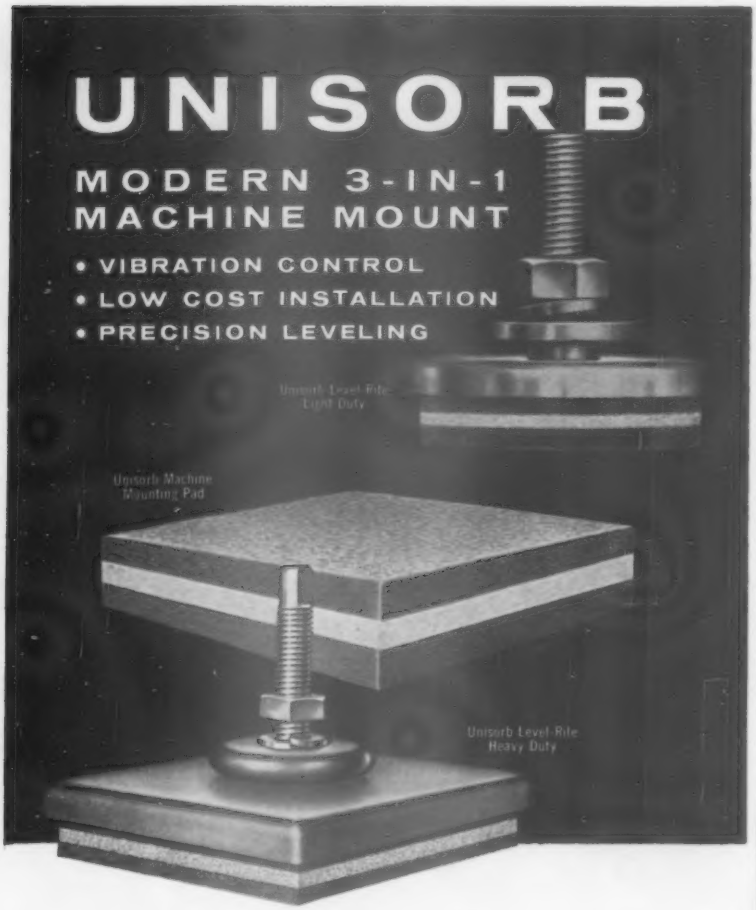
*Kalamazoo, Michigan*

SALES ENGINEERING OFFICES IN ALL PRINCIPAL CITIES • IN CANADA: Canada Fans, Ltd., 4285 Richelieu St., Montreal

# UNISORB

## MODERN 3-IN-1 MACHINE MOUNT

- VIBRATION CONTROL
- LOW COST INSTALLATION
- PRECISION LEVELING




Unisorb Pads and Unisorb Level-Rite Mounts provide a proven, fast and simplified method for installing all types of machinery and equipment.

- Cuts installation costs up to 70% . . . eliminates bolts and lag screws . . . speeds installation . . . no drilling required . . . machines can always be moved quickly.
- Eliminates up to 85% of transmitted vibration and noise . . . increases machine life and efficiency . . . reduces maintenance . . . improves working conditions.
- Unisorb Level-Rite provides fast and precise leveling.
- Safe, sure grip . . . can be cemented if needed.

Send for Unisorb Selector Chart

**UNISORB**

**UNISORB** 206 SOUTH STREET, BOSTON 11, MASSACHUSETTS
Division of The FELTERS Company
Sales Offices in New York, N.Y. • Chicago, Ill. • Detroit, Mich. • Upper Darby, Penna. • St. Louis, Mo. Taylor Felt & Supply Co., San Francisco, Calif. • Acorn Mfg. Co., Los Angeles, Calif.

Please send me details on new Money-Mount Promotion.

Name.....
Company.....
Address.....
City.....Zone.....State.....
FED-16

"PLANT LAYOUT"

# MODELS

. . . CUT ENGINEERING COST!

## IT'S A FACT!

. . . Progressive Manufacturers Have Accepted The **3-D Model** As A Sure Fire Tool For Getting The Job Done **Faster, Better, And . . . At Less Cost!**

*"It makes sense to study and solve 3-dimensional problems using 3-D"*

May **We Assist** You?

## UNITED SCALE MODELS INC.

**13 Wabash Ave.** Pittsburgh, Pa.
**201 Clayton St.** Chester, Pa.

Circle 602 on Reader Service Card

## precision CONTROLS BEST

Automated light cuts accidents, pilferage — provides *guaranteed* plant site security demanded on Government defense contracts. Precision turns lights on automatically at sunset; off at sunrise. Never uses lighting energy when light isn't needed.

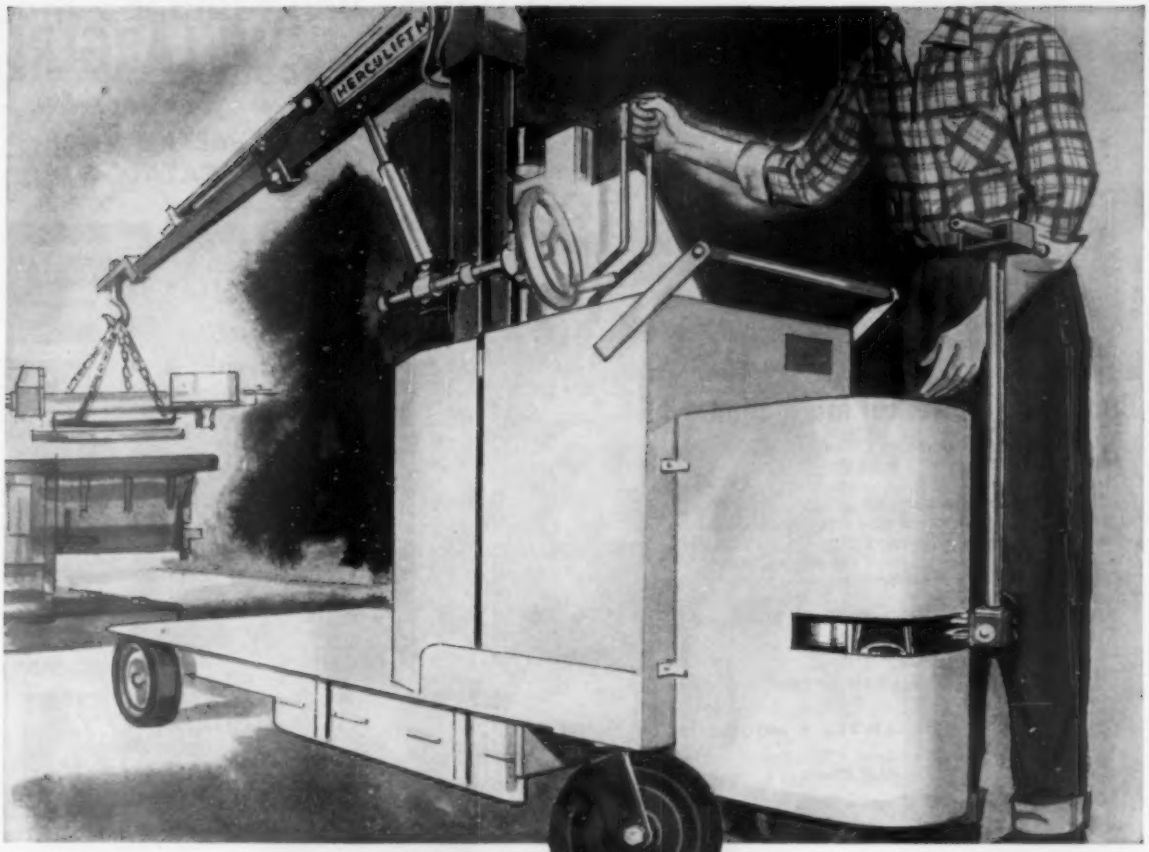
Specify PRECISION—to make *low first cost your last cost!*

pmc **PRECISION MULTIPLE CONTROLS**
*Pioneers in Automated Lighting Control*
233 CHESTNUT RIDGEWOOD, N. J.

Circle 603 on Reader Service Card

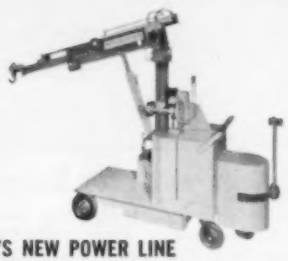



For more facts Circle 601 on Reader Service Card




# from the ground UP Colson builds it better...

Colson starts with the first essential, mobility, and begins building quality there with Colson wheels. Seventy-five years of experience go into putting together the total unit. Literally from the ground up, Colson builds it better, supplying the complete product. From wheels to completion, each part of Colson's Herculift M-10 Precision Control Crane is made with the carefulness that has made Colson famous for long lasting quality. Quality costs less. Buy once, buy the best, Colson.



COLSON'S 75th YEAR OF PROGRESS

75 years of experience in supplying field-tested equipment and casters to industry and institutions. Millions of satisfied customers know and respect the name COLSON . . . synonym for quality.

**INTRODUCING THE HERCULIFT M-10 FROM COLSON'S NEW POWER LINE**

***Travels in six directions, positions the load with pinpoint accuracy.***

Colson's versatile Herculift M-10 Precision Control Crane positions loads up to 10-thousandths of an inch in any direction: forward or backward, up or down, and side to side. Its multi-directional power lift boom reaches a full six feet beyond the chassis and raises to nine feet from the floor. Ideal for precision handling of equipment up to 5000 lbs. in weight, excellent for repairs, maintenance or installation of heavy equipment. Use the Herculift M-10 dozens of different ways, get pinpoint accuracy and work-saving speed. Available manually driven or equipped with Colson's Dyna Drive Rolling Power Pack.

***Send for free literature showing the entire new Colson Power Line . . . the most advanced and versatile material handling equipment available in the field.***

**THE COLSON CORPORATION** 7 S. Dearborn Street
Plants in: Jonesboro, Ark.; Somerville, Mass. and Elyria, Ohio CHICAGO, ILLINOIS

## Budgit Air Hoists cut maintenance 75%

Specified Plating Company, Chicago, Ill., does all kinds of plating on order. It is a 16-hour day operation.

Budgit Air Hoists cut maintenance costs 75% over electric hoists. The high moisture atmosphere doesn't harm the Budgits, so the maintenance man can now attend to regular duties.

Operators of the Budgit Air Hoists say air is faster, the job is easier, and they keep ahead of the normal work cycle. With higher production speeds, operations are nearly automatic except for dipping.

Ask your Shaw-Box Distributor about Budgit Air Hoists in ¼, ½ and 1 ton capacities and Load Lifter Air Hoists, 1 to 15 tons. Write for Bulletin 15025-1C.

***BUDGIT® AND LOAD LIFTER® AIR HOISTS***
**A product of**
**MANNING, MAXWELL & MOORE, INC.**

*Shaw-Box Crane & Hoist Division • Muskegon, Michigan*
*In Canada: Manning, Maxwell & Moore of Canada, Ltd., Galt, Ontario.*

AO-3

## 99-hour week for Budgit® Electric Hoist

Star Machine Company, Spring Lake, Michigan, keeps this Budgit Push Button Electric Hoist on 18-hour service over plating tanks 5½ days a week. Metal stampings are dipped into 11 tanks by the hoist operator. Fast push-button action permits 12 "jogs" a minute — terrific abuse for any small electric hoist, regardless of the application.

Star Machine gets continuous plating service with a complete push-button hoist installation that cost no more than $500. To learn more about this fast, tough, two-brake P:B Budgit Electric Hoist, write for Bulletin 15010-15C — or ask your nearby Shaw-Box Distributor for a free demonstration.

60A-4

***BUDGIT ELECTRIC HOISTS***
**A product of**
**MANNING, MAXWELL & MOORE, INC.**

*Shaw-Box Crane & Hoist Division • Muskegon, Michigan*
*In Canada: Manning, Maxwell & Moore of Canada, Ltd., Galt, Ontario*


For more facts Circle 605 on Reader Service Card

# NEW! LARGER!

*Universal*
**METAL HOSE CATALOG!**

***Ask for Catalog ID-100D***

QUALITY . . . *All-Metal* Flexible Hose Products

*Universal* METAL HOSE CO.

2147 So. Kedzie Ave., Chicago 23, Ill.

For more facts Circle 606 on Reader Service Card

# Save Money On Marking

**with an automatic "ROLACODER" marker**

Attaches to conveyor, case-sealer, etc. to mark from side or top • Works by friction • Imprints legible mark in same spot on case after case • Holds up to full week's supply of ink • Takes only 1 or 2 minutes to change type • No tricky adjustments • Precision-made for long trouble-free service • Pays for itself in months • Other models for marking 2 and 4 sides simultaneously

*Write for "ROLACODER" literature*

First and foremost in automatic production-line CODING, MARKING and IMPRINTING machines

Gottscho®

**GOTTSCHO** Dept. MG
**HILLSIDE 5, N.J.**

In Canada: Richardson Agencies, Ltd. • Toronto & Montreal

For more facts Circle 607 on Reader Service Card

# split-second radio contact cuts high-speed production losses

1 Quality control inspector, who has located a problem, dials the Radio Pager of a foreman . . . by using one of the FM transmitter phones located at strategic points throughout the plant.

2 When the foreman hears a tone sound from the Radio Pager clipped to his belt, he presses a button and hears the verbal instructions thru the plug-type ear receiver used for clear reception in all areas.

3 Continental Can plant manager, W. K. Brown, hears all messages over his monitor unit. By constantly being informed of plant problems, he can step in personally when the situation warrants.

**AT THE SAN JOSE PLANT OF CONTINENTAL CAN COMPANY**

***...a new quality control technique with***

## MOTOROLA Radio Pager

When Continental's inspectors detect potential flaws, adjustment instructions are immediately forwarded over the Motorola Radio Paging System to the personnel at the site of the problem. Instant corrective measures are then taken *BEFORE* a sudden flow of substandard cans would necessitate costly stoppage of the line. It's understandable why Motorola's Radio Pager has had a direct effect on reducing reject scrap and in cutting production downtime at this Continental Can Co. Plant.

The Motorola Radio Pager allows your firm to increase efficiency, save manhours and meet emergencies faster. Gone is the time wasted in chasing and tracing a certain man who is urgently needed . . . gone is the confusion of bells or public address calls. The Motorola Radio Pager slips in the pocket or clips to the belt . . . instantly, privately pages the wearer and quietly relays the message directed only to him. WRITE MOTOROLA TODAY FOR MORE INFORMATION.

*"Handie-Talkie" is a trademark of Motorola Inc.*

HANDIE TALKIE®

**MOTOROLA** Radio Pager

Motorola Communications & Electronics, Inc., 4501 Augusta Blvd., Chicago 51, Ill. A Subsidiary of Motorola Inc

# Remove and install gears, bearings, wheels, pulleys, etc. quickly and easily with . . .

# OTC HYDRAULIC "PUSH-PULLERS"

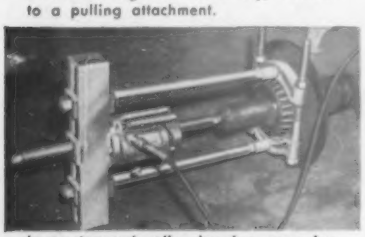
OTC hydraulic "push-puller" with attachment removes gear and bearing quickly and without damage. Push-puller (with legs threaded into a pulling attachment) is like a portable shop press.

Fifty-ton "push-puller" removing generator rotor assembly from shaft. Legs extend through the assembly, connect to a pulling attachment.

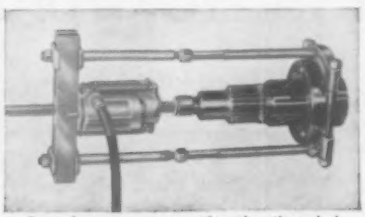
**CUT MAINTENANCE COSTS AND MACHINE "DOWNTIME." SAVE PARTS!**

OTC hydraulic "push-pullers" with attachments handle hundreds of tough, complicated pulling and installing jobs quickly, easily and without damage to parts.

Cut machine "downtime" and save parts by having the right tools in your shop to handle every job. Complete, versatile maintenance sets available in 17½, 30, 50 and 100-ton capacities. They pay for themselves in time saved.



Large tapered roller bearing cone being removed by 50-ton OTC "push-puller" and attachment connected by threaded adapters.



Two leg connectors (female threaded adapters) join extra puller legs which thread into pulling attachment to pull a bearing.

*Contact your OTC distributor for further information, or write for Industrial Maintenance Catalog. No. P-9.*

RESEARCH · ENGINEERING · DEVELOPMENT

OTC

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399 CEDAR STREET OWATONNA, MINNESOTA

Designers and manufacturers of the world's most complete line of Maintenance Tools and Hydraulic Equipment.

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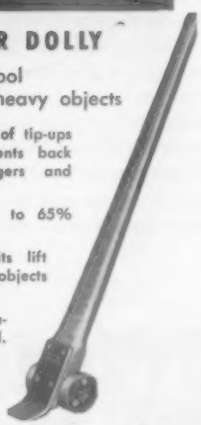
**Yanceyville, North Carolina**

**Circle 610 on Reader Service Card**

## MICRO LEVER DOLLY

a low cost safe tool to move heavy objects



Eliminates the danger of tip-ups and high falls. Prevents back sprains, crushed fingers and pulled muscles.

Cuts moving time up to 65% on large bulky items.

Correct design permits lift blade to pry under objects flat to the floor.

High leverage ratio between power and load.

Four sizes. Metal or rubber wheels. See local distributor or write to—

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**Circle 611 on Reader Service Card**



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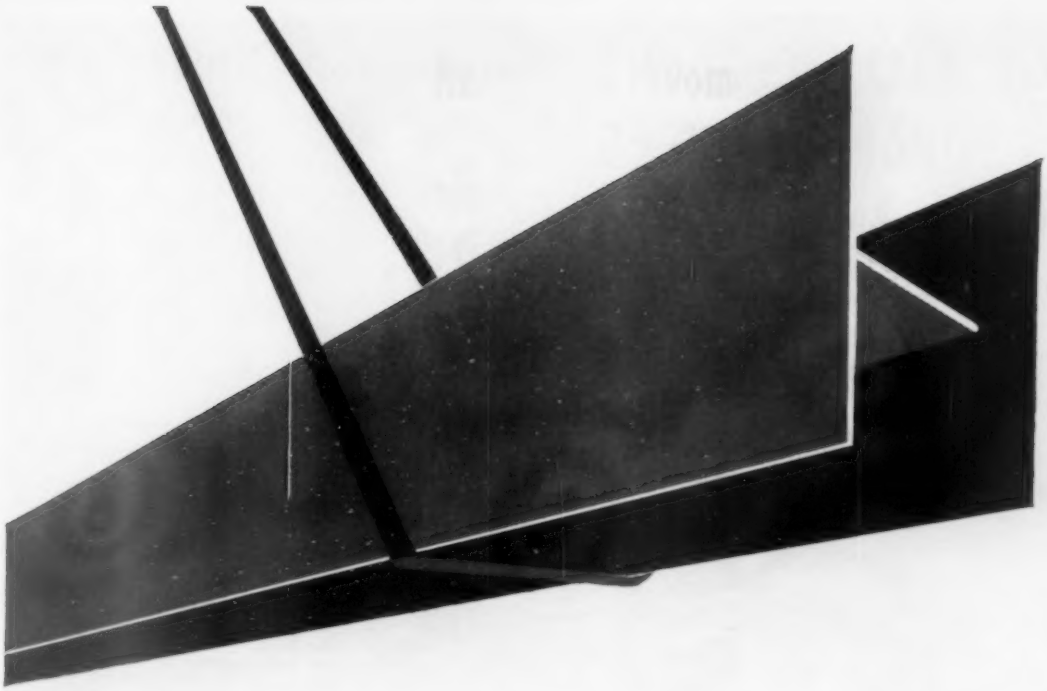

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**ROYAL McBEE** • *data processing division*

**NEW CONCEPTS IN PRACTICAL OFFICE AUTOMATION**



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Use Tubar Dumpers to solve your handling problems . . . cut operating and labor costs . . . speed-up production. We custom-build Tubar Dumpers to fit your exact job needs. Our representatives are available to give you complete information. Write today!

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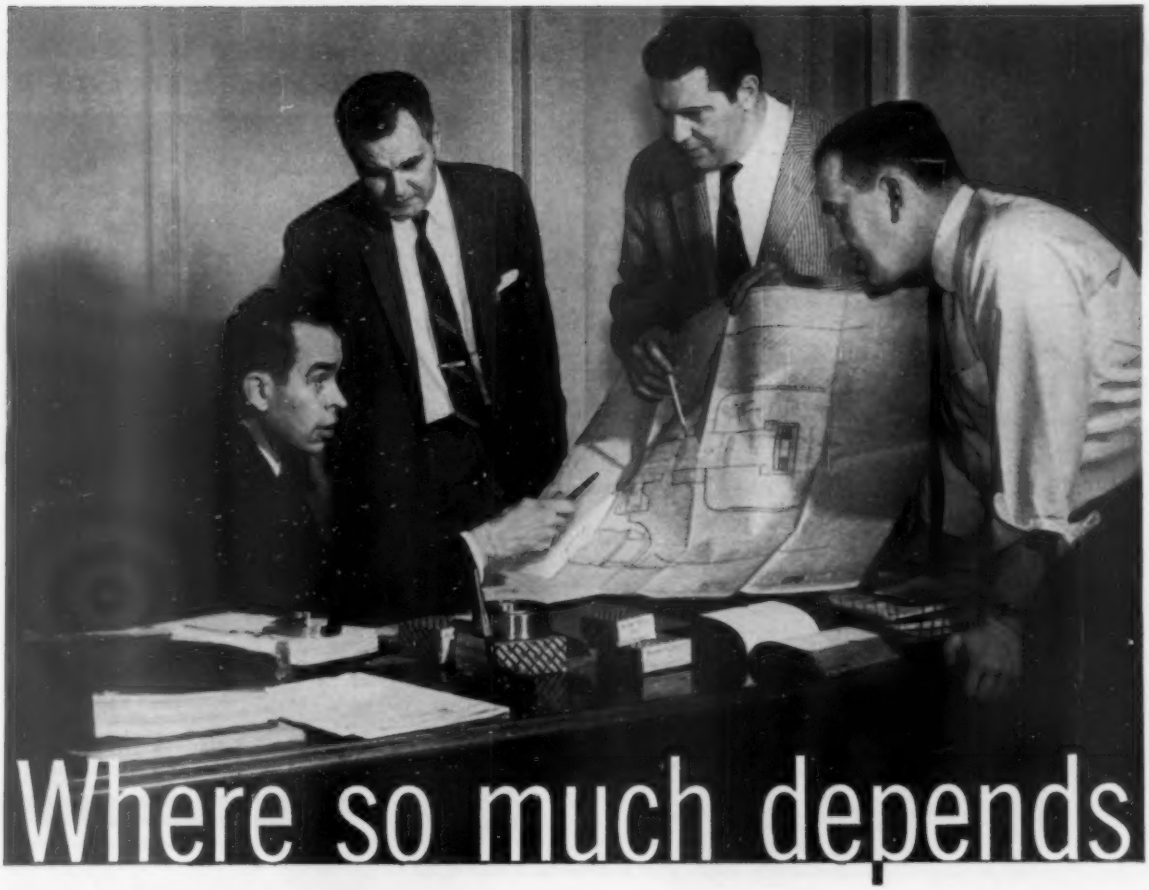

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Every Rollway Field Engineer is a bearing specialist, fully qualified to make recommendations on the spot. You will find he knows his business, *and yours,* when it comes to cylindrical roller bearings.

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• *Ask your bearing distributor man for a copy of the Rollway product line bulletin. Rollway Bearing Co., Inc., Syracuse, N. Y.*

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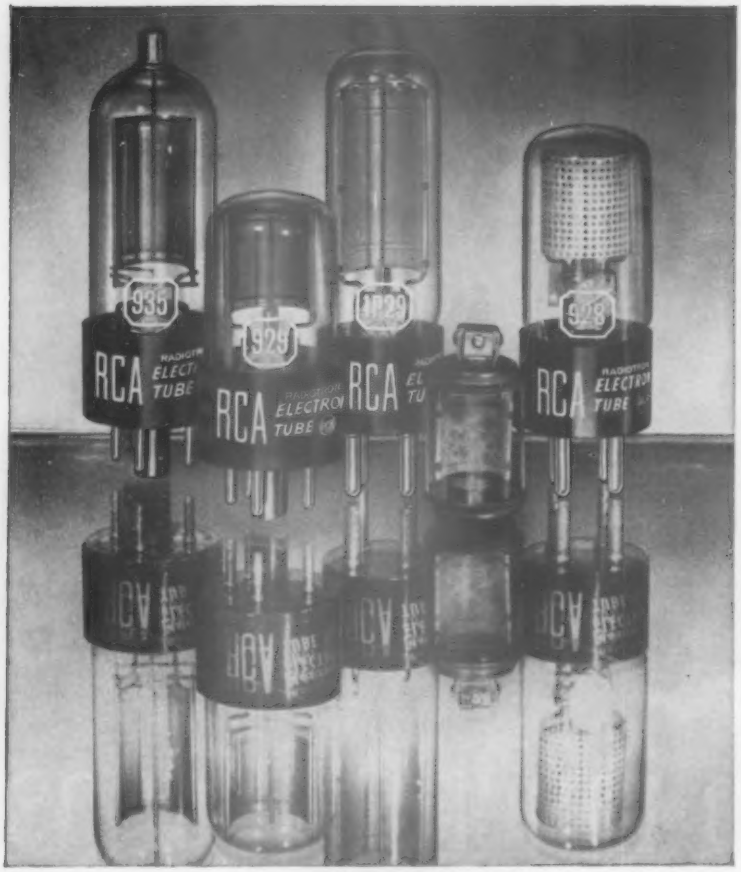


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**There's an RCA Phototube to meet your needs in**

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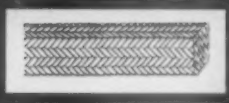

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GREENE, TWEED & CO.
NORTH WALES, PA.

**Circle 615 on Reader Service Card**

The above stamp was released on Aug. 28, 1960, to coincide with the New York City opening of the first World Congress ever held in the United States by the International Society for the Welfare of Cripples. The stamps are available from your local Post Office.

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Infinitively variable speeds from 4660 to 1.2 rpm; 10 to 1 variation, ¼, ½, ¾ horsepower ratings

# COMPACT

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## AND LIGHTER TOO

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*Get the full story about the new Sterling Fractional Horsepower Speed-Trol, write for Bulletin #201.*

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**Over 400 distributors throughout the country to serve you.**

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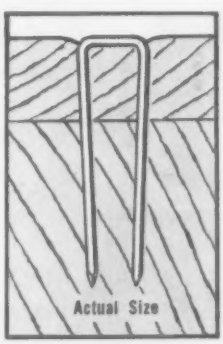
Here is an air-powered, lightweight gun that drives heavy duty 16 gauge staples, up to 1½" long, that outhold nails.

Because it is 4 times faster than hand nailing, the S-762 knocks down the cost of assembling crates, boxes, wood frames, expendable skids, and many other nailing jobs.

*Example: Crating costs tumbled 80% for a store fixture manufacturer when they changed to DUO-FAST Staple Nailers.*

But the S-762 DUO-FAST Staple Nailer is only one of a complete line of manual and air-operated tools. There is a DUO-FAST Stapler/Tacker/Nailer that is *precisely right* for your industrial fastening jobs.

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Everything you need for tacking, stapling and nailing.

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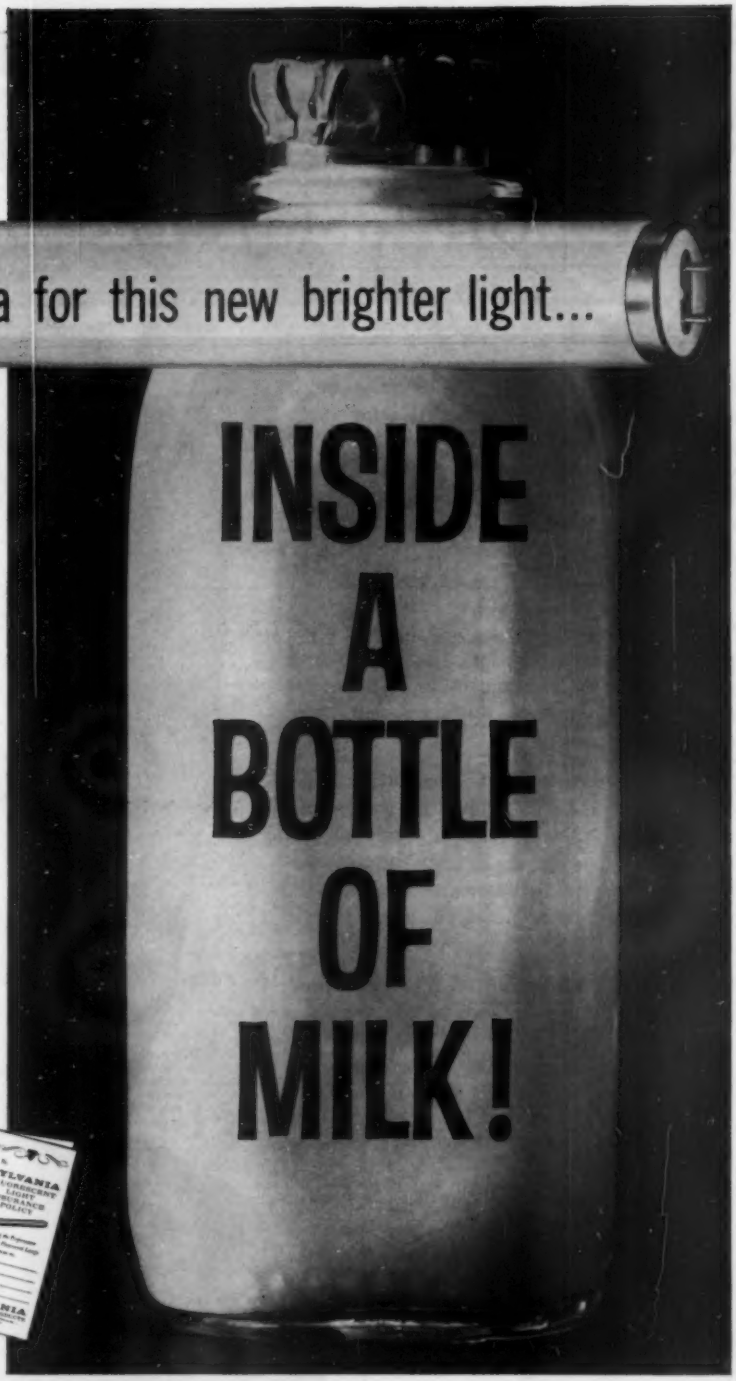


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*"If at any time a Sylvania Fluorescent lamp fails in your opinion to provide better performance than any other brand fluorescent lamps, on the basis of uniformity of performance, uniformity of appearance, maintained brightness and life, it may be returned to the supplier for full refund of purchase price."

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*Subsidiary of* **GENERAL TELEPHONE & ELECTRONICS**



For more facts Circle 618 on Reader Service Card

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"Past practices of your own or of your competitors will produce no magic ratios by which you can either judge or budget the right amount of advertising automatically as a percentage of past sales.

"Plans for increasing sales volume, sales revenue and resulting profits by product and by territory or by divisions, can better be analyzed and approved by considering advertising as a programmed cost to be associated with specific profit plans and to be measured against specific results.

"Programming advertising costs as a measured, reasoned and integrated part of a future profit plan usually results in a better plan and better actual future profits."

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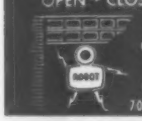
*...Electronically*

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. . . are offered to experienced professional personnel by the National Lead Company of Ohio.

*Present openings include:*

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**MECHANICAL ENGINEER**
with experience in maintenance of chemical process equipment.

**VENTILATION ENGINEERS**
Chemical or Mechanical Engineers with experience in dust and fume control.

Our company offers challenging technical work in a stimulating professional atmosphere, an excellent benefits program, and company paid relocation expenses. Salaries are commensurate with experience.

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***Dept. J-104***

**NATIONAL LEAD COMPANY OF OHIO**
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CINCINNATI 39, OHIO

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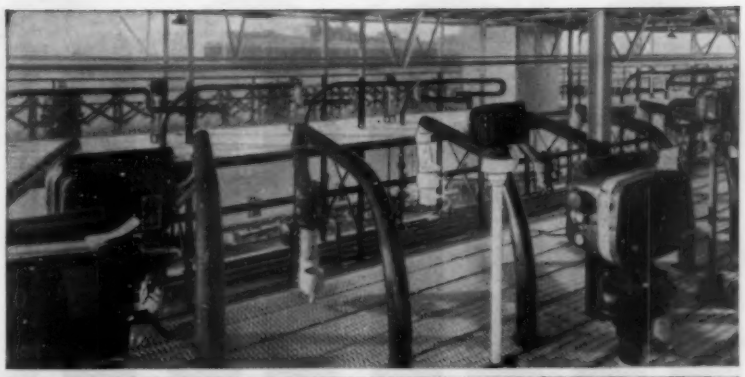

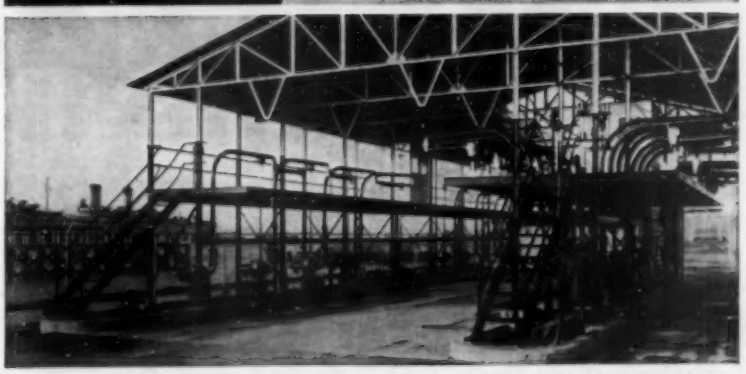

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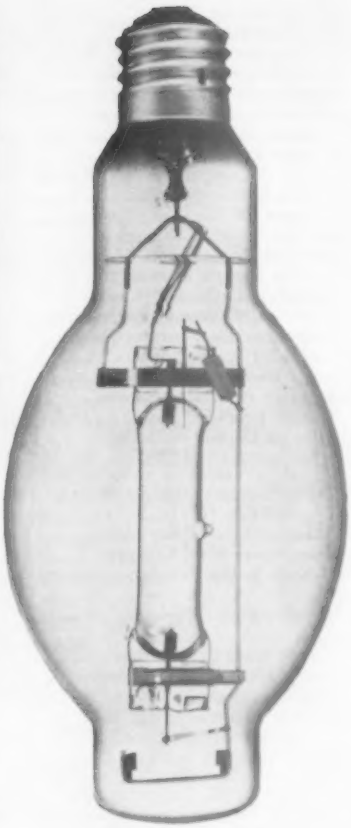

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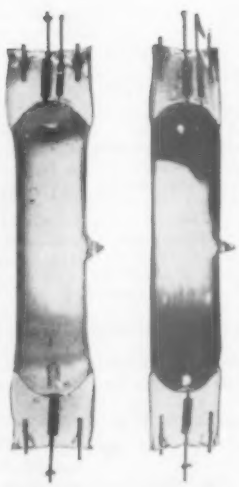

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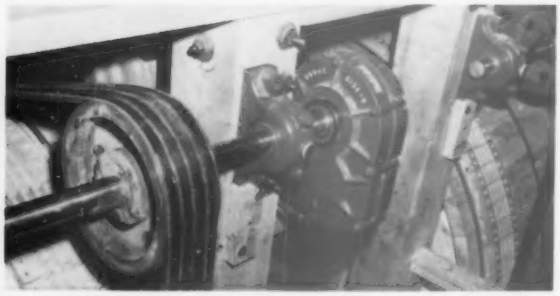
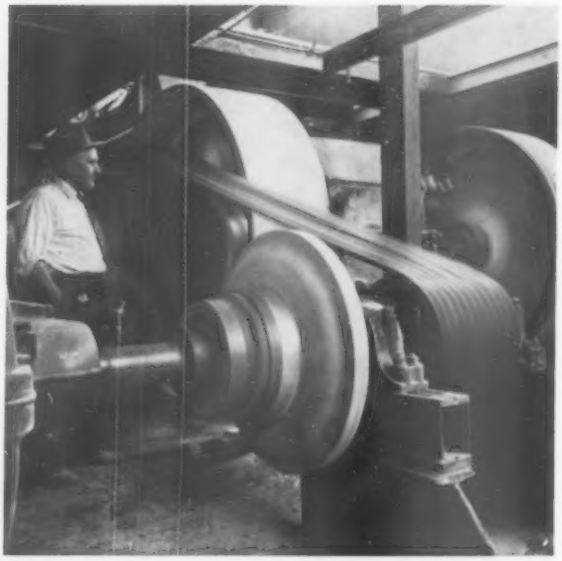
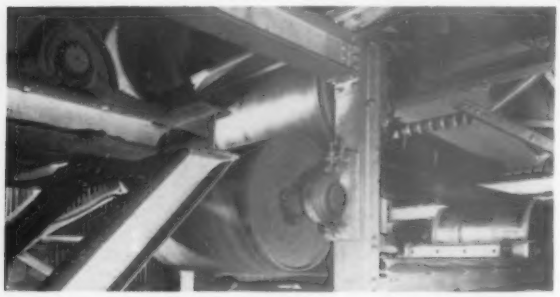
# How Dodge pillow blocks with Timken® bearings give longer life with less maintenance



**1. Two 2⅞" Dodge Special Duty** pillow blocks equipped with Timken® tapered roller bearings, support the line shaft driving six by eight foot tanning drums. The tapered design of Timken bearings enables them to take both radial and thrust loads in any combination.



**2. The crusher** at a trap rock and asphalt plant runs faster, gives more production now that Dodge Double Interlock pillow blocks on Timken bearings are installed. The Timken bearings in these blocks give full-line contact between rollers and races for greater load carrying capacity.



**3. The Timken bearings** in All-Steel Dodge pillow blocks must stand up under adverse operating conditions found when sintering metals. One major advantage of Timken tapered roller bearings is their ability to hold housings and shafts concentric, thus keeping lubricant in, dirt and dust out.

The photo at right shows the Dodge All-Steel pillow block Timken bearing equipped. The specially designed bearing has a tapered bore with self-aligning spherical outer surface—never needs adjustment.

There's a Dodge pillow block equipped with Timken bearings to fill every engineering need: All-Steel, Type "E", Double-Interlock, Type "C" and Special Duty. And with Timken bearings, space consuming thrust devices are not needed. Look for Timken bearings in all the machines you buy or build. They're the symbol of quality. The Timken Roller Bearing Company, Canton 6, Ohio. Cable address: "TIMROSCO". Makers of Tapered Roller Bearings, Fine Alloy Steel and Removable Rock Bits. Canadian Division: Canadian Timken, St. Thomas, Ont.

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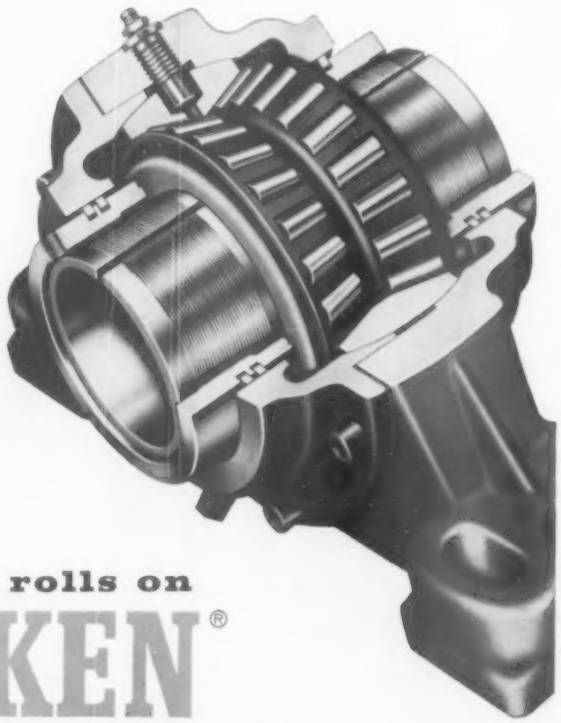

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